

# MOTOR AGE

Chicago, April 10, 1913

Ten Cents a Copy



The name MOON has  
become synonymous with honest  
construction in motor cars—it's selling  
lots of cars for MOON dealers.

MOON MOTOR CAR CO.

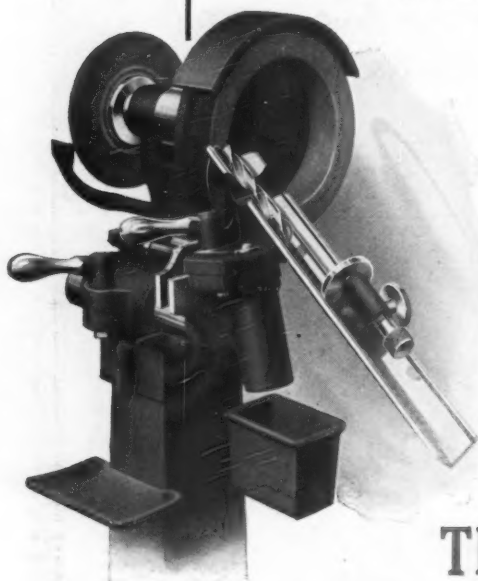
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Moon 39 Completely Equipped \$1,650

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Standardized as the Best Investment

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Two years ago they bought a 3-ton Peerless for their Chelsea branch (Pope & Cottle Co.) After it had been in use for a year, a second Peerless was installed at the same point.

Both Peerless Trucks have given satisfactory service at a low maintenance cost. The experience of the Chelsea branch resulted in an order for five 4-ton Peerless Trucks to standardize the equipment at the main yard.

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Makers also of Peerless Passenger Cars

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*Peerless*

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When automobiles first established themselves as pleasure vehicles they found more adherents among men than women.

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Manufacturers have tried in many ways to overcome the disagreeable action of car springs but so far they have discovered only one true and effective means—the Truffault-Hartford Shock Absorber.

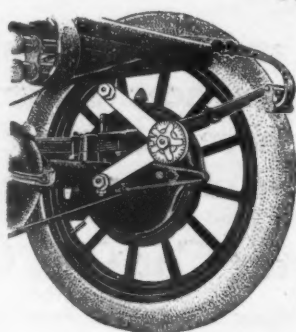
Rubber bumpers, straps and auxiliary springs have unquestionable value, but they are not shock absorbers because they cannot preserve ease of riding.

You have seen other makes of shock absorbers come and go, several to be eliminated by court proceedings as infringements on Truffault-Hartford patent rights.

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**SHOCK ABSORBER**  
"The Pioneer Shock Absorber"



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*Manufacturers of Hartford Electric Starter*



# MOTOR AGE



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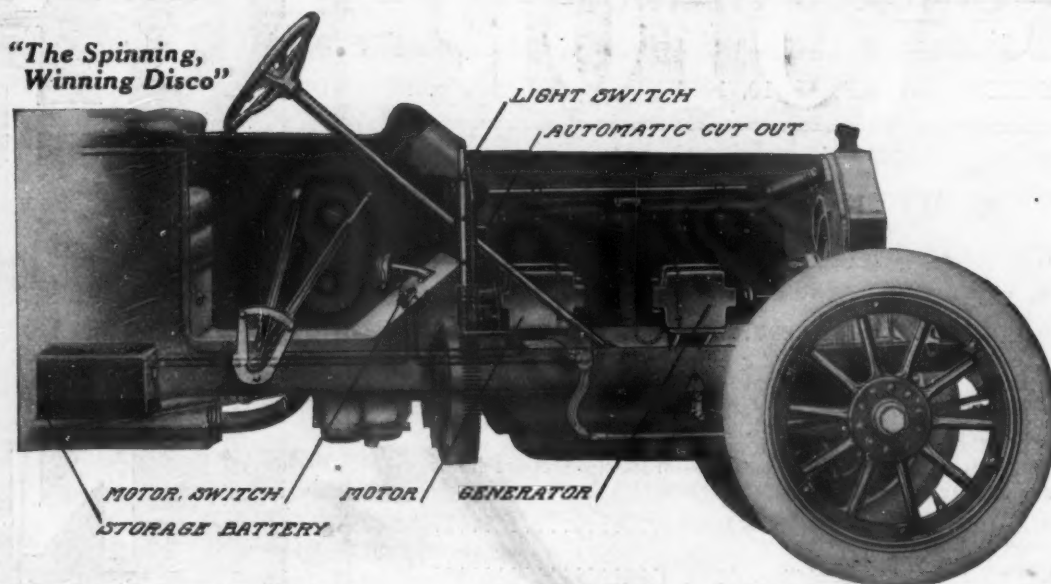
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**BALL BEARINGS**

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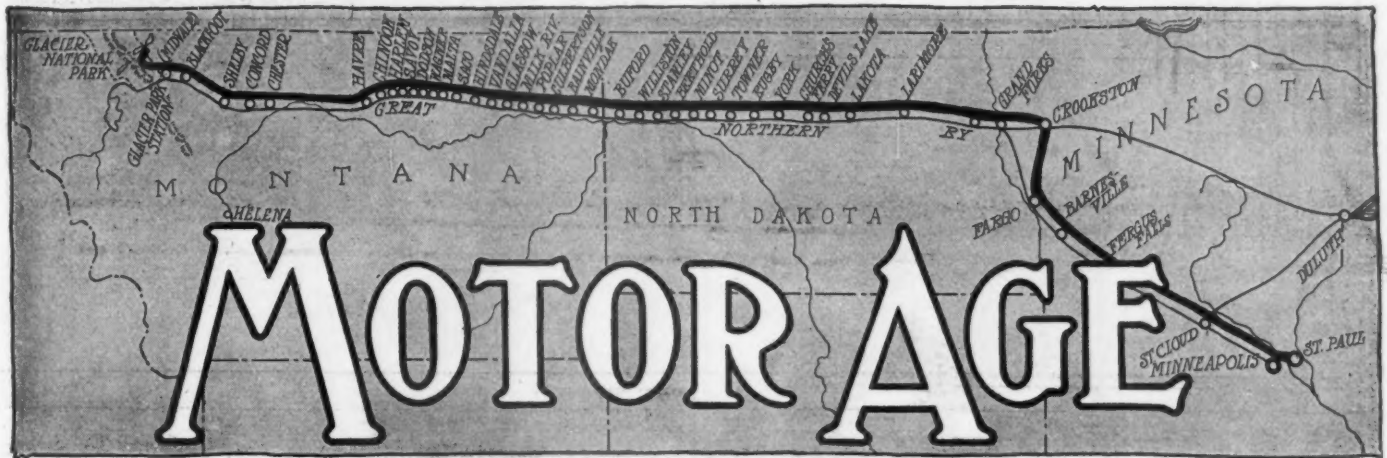
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ROUTE FAVORED BY MINNESOTANS FOR THE NATIONAL RELIABILITY TOUR

## A. A. A. Hosts Invade Northwest

### Features of 1913 National Reliability Route

By J. C. Burton

FOLLOWING the trails of the pious Jesuit missionaries, the intrepid explorers of Lewis and Clark and the rugged trappers sent out by John Jacob Astor to ensnare in the howling, snarling wilderness of the northwest the foundations of a colossal fortune, participants in the national reliability tour of the American Automobile Association, last week awarded to Minneapolis and St. Paul by the A. A. A. executive committee, will visit landmarks of unusual historic interest and places of unsurpassed scenic grandeur in their journey across the states of Minnesota, North Dakota and Montana next July, if tentative plans are carried out.

Leaving the twin cities, Minneapolis and St. Paul, very likely on July 7, the motorists will ride for 8 days through a country rich in agricultural and mineral resources, a land where the hills and valleys echo with the tales of pioneers' privations and adventurers' lust. The 1,500-mile run will terminate among the everlasting snows of National Glacier park, a wonderland tucked away in the northwest corner of Montana. The Gophers want the tour to end at Glacier park, the A. A. A. wants Kalispell. The matter will be definitely settled inside of a week.

#### Are Twentieth-Century Argonauts

The twentieth-century argonauts, riding in modern prairie schooners propelled by gasoline, will trek across the abandoned hunting grounds of the Ojibway, Dakota and Sioux and scale the rocky throne of the Great Spirit. Motor horns will sound a blast of progress where once the savage war whoop of the redskin was answered by the petulant popping of the pioneer's rifle. Motor lamps will send a friendly glow over the plains where less than a century ago hostile camp fires flickered with a menacing glare and made the pioneers fear for their lives.

It will be a cavalcade of progress into



SPERRY GLACIER BASIN CHALET CAMP





MINNESOTA. "BREADBASKET OF THE WORLD"



VIEW IN LAKE PARK REGION OF MINNESOTA

a country of perpetual romance, historical and geological.

Rubber-shod wheels will leave their marks where the hoofs of the lumbering buffalo and bison, stampeding steer and faithful broncho made their imprint in the pre-motor epoch.

Scattered sporadically over the plains and among the foothills are the Indian reservations where live in peace and quiet the painted terrors of the northwest's dark ages and the civilized descendants of the warriors who slaughtered Custer and his resolute band that red July afternoon at the Little Big Horn.

#### The Farmer in Evidence

The unromantic overalls and expansive straw hat of the farmer are seen in the fields of golden wheat and blue flax. They have replaced the gay chaparejos and rakish sombrero of the cowboy as insignia of labor. The whirring mower and puffing thresher are heard instead of the neighing mustang and shouting cattle rustler. Meek herds of sheep, which in the last quarter of a century have gradually encroached on the domain of the cow baron, now graze among the skeletons of steers, ghastly

relics of the bygone day of the pioneer.

In the pine-crested hills are the realized ambitions and the sunken hopes of the prospector. Piles of ore mirror the smiles of fickle Fortune. Rusty dump carts mark the sites of abandoned claims. The miner's pick and shovel have dented the earth's strata with romance. After one glance at the hidden vaults of Nature, imagination runs the gauntlet from pathos to joy.

The route for this year's touring classic will take the contestants for the National, Anderson and Glidden trophies through a country of rolling contour, over the twisting trails of the nomad buffalo herds and into the Bad Lands of North Dakota. In that barren waste of sand where only the hardy cactus can survive are the dry alkali lakes which have shimmered in the glaring sun for centuries and mockingly invited the thirst-crazed traveller to drink deep of the cool waters that flow not in those incrustated pools of disappointment and soul-torment.

Every milestone that marks the winding path through three states tells a story of heroism, sacrifice and martyrdom. Every mountain, lake and stream is immortalized in Indian legend. The national reliability tour of 1913 will be a ride into the pulsating past. The cars will crash through barriers to romance and carry their occupants over trails once red with the blood of the pioneer and adventurer.

#### Northwest a Land of Romance

The great northwest is not only a land of romance; it is a country of tremendous possibilities where the inhabitants have made the most of their inheritance. Persistence was the richest heritage left by the pioneer to the present generation, a heritage that has transformed arid regions into fertile fields and gave Dakota and Montana the strength to follow the pace of progress. Every silo silhouetted against the blue sky, every dwelling and barn of the hustling homesteader, every fruit tree bending under the load of its luscious yield is a symbol of present prosperity and future promise.

It is doubtful whether another section

of the United States affords as attractive a route for a tour of the character of the A. A. A. reliability contest as does this territory of romance and reclamation. The vagrant trails, leading over mountain and plain, will put the cars to a rigorous efficiency test; the historic landmarks and scenic wonders will make the 8-day ride anything but tedious for the participants.

#### Trail Not Uncharted One

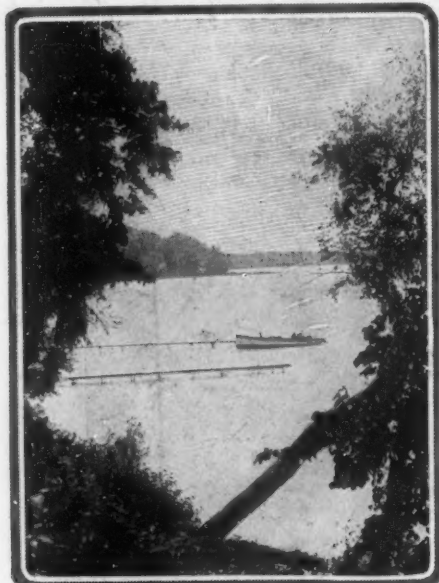
The A. A. A. tour will not be a blind dash over roads uncharted. It will not be a trail-blazing expedition. Two years ago motorists of the Minnesota State Automobile Association drove over practically the same route with a minimum number of penalizations—seven cars finishing with perfect scores and only two of the nineteen contesting cars withdrawing—and the maximum amount of pleasure.

There were some hardships encountered to be sure, but the scenic delights and historic attractions more than proved a balm for bruises suffered in jolting over rough and hilly highways and in following the winding buffalo paths.

That conditions for the reliability classic of 1913 will be much better than they were for the M. S. A. A. run of 1911 is certain for the residents of Minnesota, North Dakota and Montana are good roads enthusiasts and have improved the highways greatly in the past 2 years.

A patriarch of the union compared with North Dakota and Montana, Minnesota's road problems have not been extremely difficult of solution. Country roads long have been established and worn by continual travel, and engineers have had no mountain ranges to contend with in improving the highways through the rich prairies of the Gopher state.

The road-builders of North Dakota and Montana, on the other hand, have been forced to conquer natural obstacles in their work of transportation improvement. In Montana especially have the labors been arduous. Through the virgin forests of pine that clothe the hills and into the heart of the mountain fastnesses, the residents have hewn pathways 50 feet in



LAKE MILTONA, ALEXANDRIA, MINN.



width, covered them with a surface of natural rock, rolled them with heavy steam rollers and converted what were a year or so ago but tortuous pack trails, where even the nimble-footed mountain sheep stumbled and fell, into motor roads that compare very favorably with the city boulevards.

Wherever possible these new-made roads are wide, but in the mountains it will be years before the trails can be widened sufficiently to permit two vehicles to pass except at rare intervals. All through the mountains of the state wind the narrow but hard and smooth roadbeds, always on the brink of some canyon with cliffs rising sheer on one side and a steep precipice dropping to a roaring river hundreds of feet below on the other.

Road building is a new experience for Montana but the residents are persistent in their attempts to make the state attractive to the motorist. North Dakota is just as progressive in this regard. Co-operating with Montana, the inhabitants aim to make the highway between Grand Forks and Glacier park the longest link in the Wonderland trail which will connect Duluth with Spokane and Seattle when completed.

#### Follows Great Northern Railway

The national reliability tour of 1913 has been so routed that it parallels the line of the Great Northern Railway the greater part of the way. A special hotel train, providing accommodations for at least 150 persons, will accompany the tourists and stop at all noon and night controls to serve meals and provide sleeping quarters. The traveling inn de luxe, which was one of the unique features in connection with the M. S. A. A. contest, probably will be made up of two diners, five sleepers, a compartment press car, supply car carrying tires, supplies and emergency parts, and a baggage and dynamo car.

Diversity of scenery alone makes this route attractive. Lucid lakes, broad prairies, rolling foothills, rich plains where acres of wheat bend before the summer wind and herds of cattle or flocks of sheep

roam, towering forests of pine, and then the arrogant Rockies will be seen on the 8-day ride. There are deer and bear in the woods and mountains, trout in the rippling streams.

#### Itinerary of the Tour

The itinerary of the Minnesota tourists most probably will be accepted this week, when the Twin City motorists hold a meeting to formally pass on the schedule. The A. A. A. proposition to finish at Kalispell does not meet with favor because it would lengthen the tour 3 days because there is no direct road from Glacier Park Station to Kalispell. The first day's run will be from Minneapolis to Alexandria, a beautiful resort located on the shores of Lake Geneva, a ride of 140 miles half-way across the state of Minnesota over the historic trails that Lewis and Clark blazed through the prairie more than a century ago. It is a region of great beauty, studded with tiny lakes.

The second leg of the journey is a trifle shorter, 124 miles, and the contestants will check in at Fargo for the night. While most of the roads are good, some are quite rough and will require careful driving. A greater part of this ride lies through prairie land where there are only two wheel tracks to form the highway.

On the 200-mile dash from Fargo to Devil's Lake on the third day, the motorists will ride practically all the time in the former domain of the treacherous Sioux chief, Sitting Bull. Life-sustaining grains now grow on the broad plains where 50 years ago the conqueror of Custer held his war councils and rallied his painted braves for the massacre of the paleface settlers of Minnesota and Iowa.

Thrice crossing the state line after leaving Fargo, the tourists will follow the wandering trail to Grand Forks, which probably will be chosen as the noon control. The smooth gumbo roads are excellent in dry weather and the greater portion of the way is over flat prairie land without many fences, trees or landmarks.

Because of the few long stretches of good road, the fourth day's ride of 159



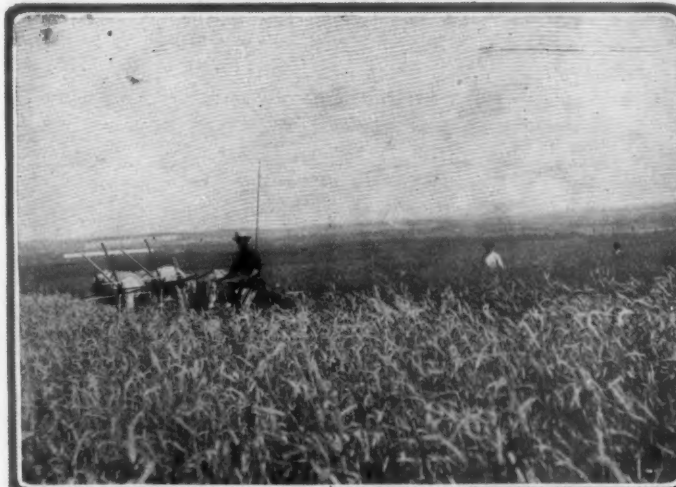
MOTOR ROAD IN GLACIER PARK

miles, from Devil's Lake to Berthold, may cause some spinal jolts far different than the sensations produced by the melodrama. Part of this route leads over sand hills of steep grades requiring the use of first and intermediate speeds by the drivers of even the most powerful cars. The monotonous horizon line occasionally is broken by abandoned, weather-beaten log cabins which were deserted by their builders when the arid soil refused to yield the expected crops.

#### Into Montana Fifth Day

The motoring pilgrims will ride from Berthold across the state line to Culbertson, Mont., on the fifth day, a distance of 167 miles, according to the preliminary schedule. For 25 miles out of Berthold the tourists will travel over virgin prairie where the old buffalo paths skirt the brinks of treacherous coulees or dip in and out of the hills. The twisting trails, with the innumerable branches that strike off at all angles, make the route impossible to follow without the services of a guide.

After leaving Williston, the noon control, where the United States reclamation



FARM SCENE NEAR HAVRE, MONT.



MOTOR ROAD TO ST. MARY'S LAKE

service has built a giant irrigation pumping plant, the motorists will follow the yellow waters of the Missouri river. High clay bluffs, worn into fantastic shapes by centuries of erosion, rise on one side of the road, while on the other the tortuous stream winds through beautiful valleys. **Bad Lands of North Dakota**

The territory adjacent to the state line is known as the Bad Lands of North Dakota, an expanse of sand and alkali where in pioneer days the coyotes and buzzards fought for human flesh.

A sort of motor vaudeville will feature the 183-mile trip from Culbertson to Malta

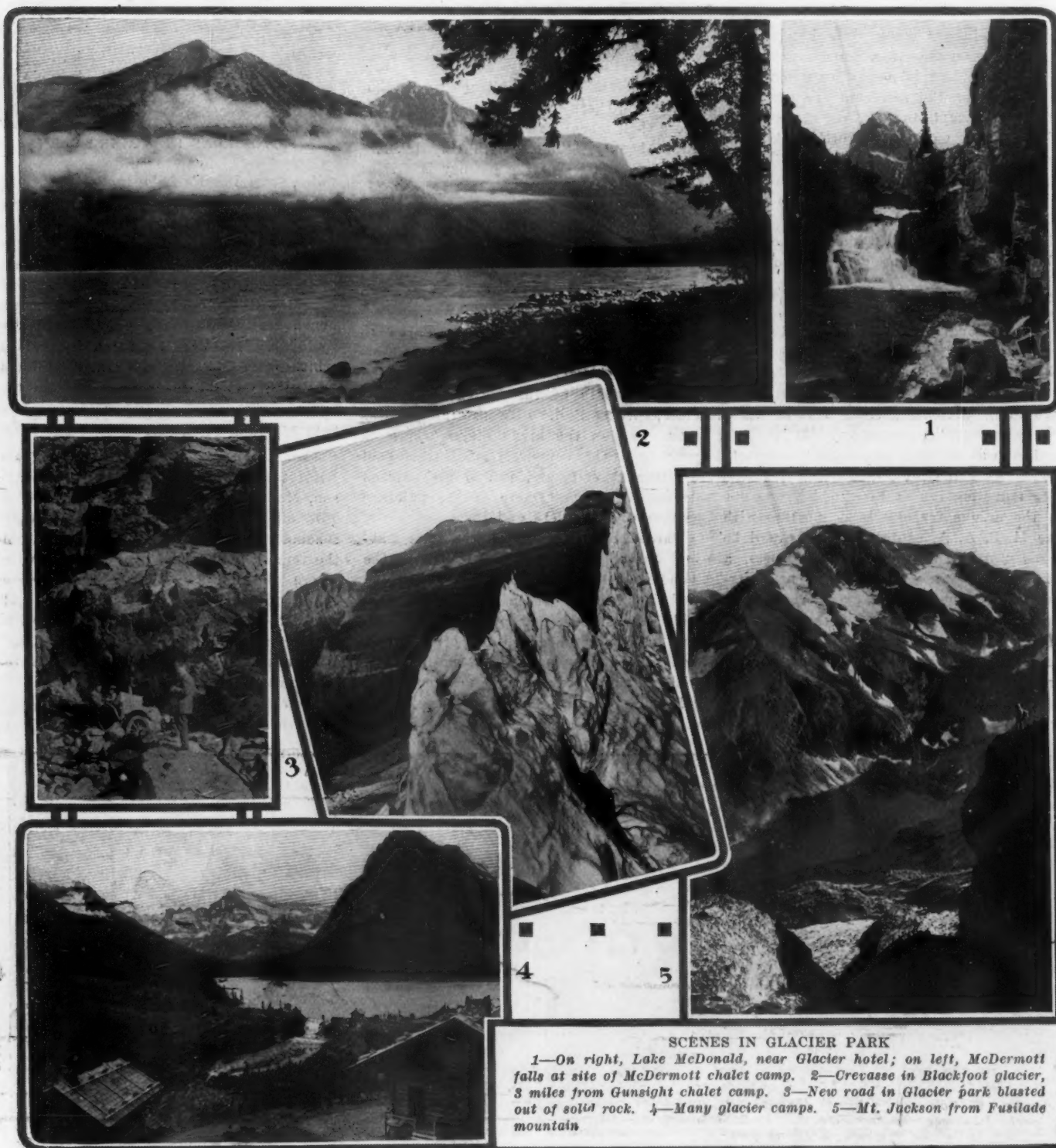
the following day. At Poplar, which is located on the Fort Peck reservation, arrangements will be made with the Indian agent for a war dance and the redskins, gay in paint and feathers and riding on bell-haltered ponies, will perform some terpsichorean evolutions that even the exotic and expert Pavlova and Mordkin could not imitate.

After an hour's ride over the prairies, Glasgow, a tough town in the early days that has been but partially regenerated, will be reached. The faro dealer still is a social necessity at Glasgow. The crudely built shanties are ornamented with "\$500

Reward, Dead or Alive" placards. It is a town of frontier lawlessness, where the citizens continually celebrate their escape from civilization's ennui.

#### Cowboys Promise Reception

Just before reaching Malta, the trail on which the hounds of General Nelson A. Miles chased the fox of the Sioux, Sitting Bull, will be crossed and at Malta the cowboys will form a reception committee to welcome the motorists. For many years Malta was the heaviest cattle shipping point in Montana and even today the biggest round-ups in the state are held in the vicinity of this town. On the prairies that



#### SCENES IN GLACIER PARK

1—On right, Lake McDonald, near Glacier hotel; on left, McDermott falls at site of McDermott chalet camp. 2—Crevasse in Blackfoot glacier, 3 miles from Gunsight chalet camp. 3—New road in Glacier park blasted out of solid rock. 4—Many glacier camps. 5—Mt. Jackson from Fusillade mountain.



encompass it the Olympic games of the frontier are staged, broncho bucking, steer roping and cattle branding contests and exciting races between cowboys and the Amazons of the plains, the cowgirls.

#### Seventh Leg of Journey

The 92-mile trip from Malta to Havre probably will form the seventh leg of the journey. The roads in this section are good in dry weather, but should it rain a detour, such as was taken by the Gopher state tourists in 1911, will be imperative. Such a change in route will necessitate a journey over the rough roads in the barren rolling country to the north known as the

Mosquito Flats, a few miles from the Canadian boundary. The trails through rocks, sand and sagebrush are dim and the way is cut by deep gullies and washouts.

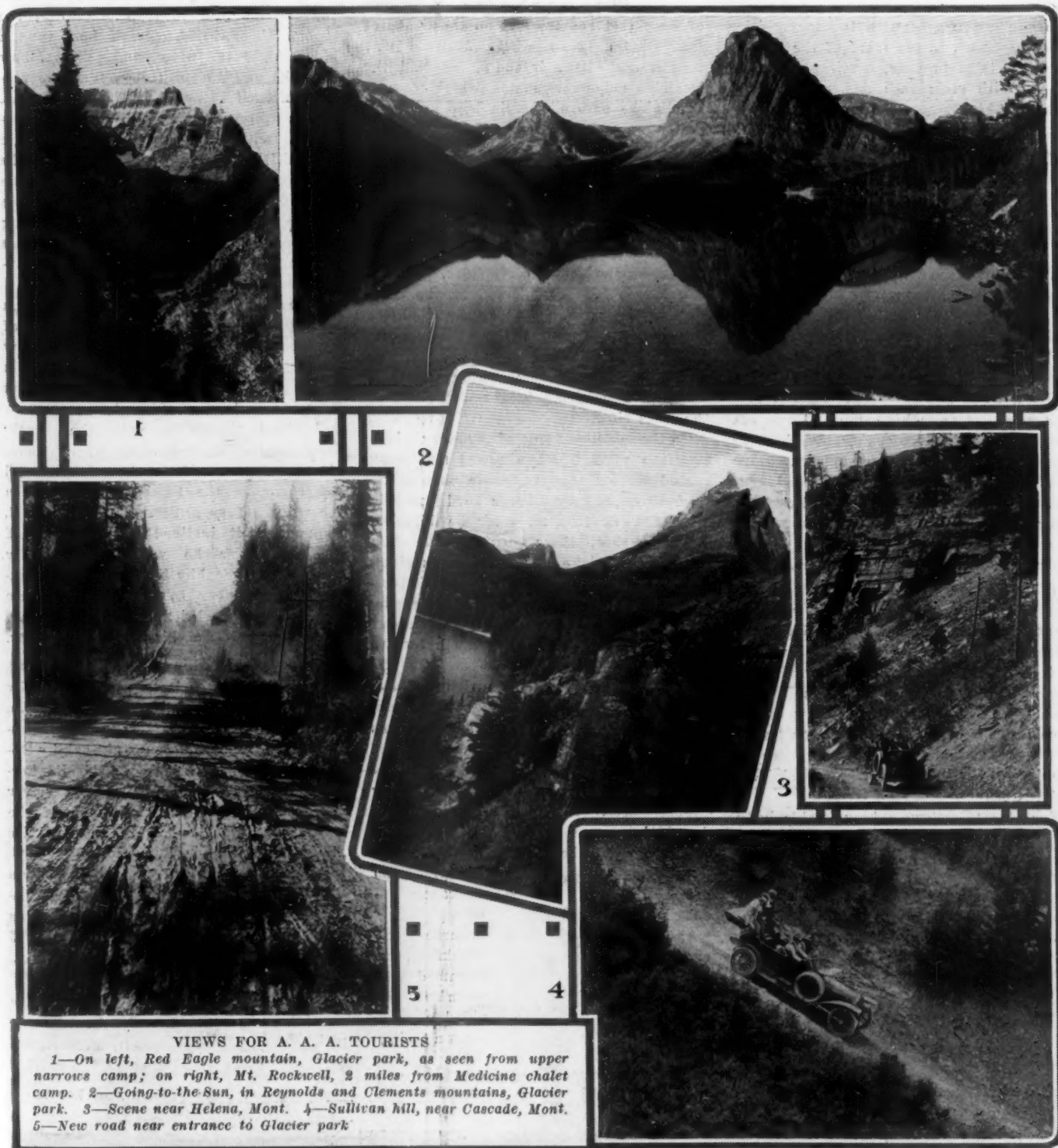
At Havre the route of the M. S. A. A. tourists, who went south through Great Falls to Helena, will be abandoned and the contestants for the trophies will continue west approximately 200 miles to Glacier Park Station, formerly known as Midvale, where the tour will terminate. The final day's run will take the motorists through the Blackfeet reservation and into the majestic Rockies.

Just as the route is attractive, the ter-

minus is ideal. After an 8-day ride over dusty prairies and in the scorching July sun, the tourists will be glad to recuperate among the snow-capped mountain peaks and mighty glaciers of nature's playhouse above the clouds, where cascades play restful sonatas and the cooling mist envelops the fatigued visitor in a cloak of peaceful abandon.

#### Glacier Park Features

Glacier park embraces more than 1,400 square miles of the Rocky mountains, extending north from the main line of the Great Northern Railway to the Canadian border, a distance of 60 miles, and from



#### VIEWS FOR A. A. A. TOURISTS

1—On left, Red Eagle mountain, Glacier park, as seen from upper narrow camp; on right, Mt. Rockwell, 2 miles from Medicine chalet camp. 2—Going-to-the-Sun, in Reynolds and Clements mountains, Glacier park. 3—Scene near Helena, Mont. 4—Sullivan Hill, near Cascade, Mont. 5—New road near entrance to Glacier park



the Blackfeet reservations on the east 50 miles to the north fork of the Flathead river.

Rising majestic above the timber line are mute monsters of stone and ice, haughty giants tamed by man after a battle of centuries. They now extend a welcome instead of a challenge. Of glacial formation, these mountains are older than the fanciful aborigines that christened them. They link the primitive to the present. In their lowest strata are the bones of the lethargic dinosaur; at their feet repose modern chalets designed for the comfort of the twentieth century explorer.

#### Legend of Chief Mountain

Every mountain, stream, glacier and cascade is pregnant with Indian tradition and associated in the mind of the redskin with deeds of prowess, heroism and sacrifice. With stoic face and rugged brow stands Chief mountain, named by the Blackfeet tribe in honor of an ancient warrior who went on the warpath and left a sorrowful squaw in his tepee. This is the tale of a hero's bravery and a woman's broken heart:

In the old days there was a young man of the Blackfeet who was noted for his personal bravery in war. His courage was appreciated and he was made head war chief of one of the big bands of the Peigans. Falling in love with a girl of his tribe, he married her and then lost all desire to take the scalps of his enemies. After a while one of the Peigan war parties went out from his camp and was cut to pieces by the Kootenais, only three or four members of the vanquished party getting back to tell the tale of the slaughter. The chief, his anger aroused and his desire for revenge insatiable, announced at a war feast that he would go on the warpath and punish the offenders.

His woman said that if he went on the warpath she would accompany him. This he forbade. In turn she replied that if he went without her he would find a cold and empty lodge—meaning she would kill herself if left alone—upon his return. Both were obdurate but the squaw finally gave in and the chief went out as leader of a big war party that met and defeated the enemy, but in the fight he was slain.

#### Chief Goes on Warpath

The chief's followers brought his body back to the camp, which was at the foot of or near Chief mountain. When his squaw learned of his death she was touched by the Great Spirit (crazed) and wandered about looking for her man and calling to him. Although carefully watched by her people, she slipped away with her baby one day and was far up the side of Chief mountain before anyone saw her. Runners were

sent after her but she was too fleet for them and gained the top from where she signaled to the camp in sign language that she had found her man and was going to him.

Then she threw the baby far from her out over the cliff that forms the face of Chief mountain and then leaped herself. Both mother and child were crushed to a pulp on the rocks thousands of feet below. She was buried where she fell and her chief laid to rest at her side. From that time on the majestic peak was called Ninnow Stahkoo, the Mountain of the Chief or Chief mountain as it is known today.

Flowing turbulently through the park is Two Medicine river, a name that originated long ago when two large bands of Blackfeet Indians met on the banks of this stream below where Midvale now stands, each tribe intending to hold the medicine lodge ceremonies, which were of a religious nature wherein help and prosperity were asked of the sun and of the gods, tending to increase the welfare and happiness of the whole people.

#### Naming Two Medicine River

When the two bands learned that they had both come for the same purpose they camped together, each band holding its own medicine lodge ceremonies, but the two lodges being conducted at the same time and place, the only occasion when this was ever done among these people, the event gave rise to the name Two Medicine river, meaning to the Indian the river where two medicine lodges were held at the same time.

On the northwest side of St. Mary's lake stands a peak which a proud marksman named for his prowess Single Shot mountain, christened by George Bird Grinnell, a New York trapper, after he killed a mountain sheep there with a single shot.

St. Mary's lake and St. Mary's river, called by the Blackfeet the lake-and-river-of-the-good-spirit-woman, were named by Hugh Monroe, a French Catholic trapper of the Hudson Bay company, the first white man to live with the Blackfeet. He was adopted by the tribe and married a squaw.

He was called Mick-qua-ee-poh-wock-sin, literally "Rising Wolf," by the redskins from his habit of rising quickly on his hands when awakened from sleep, just as a wolf rises on his forepaws under similar circumstances. Also Monroe "slept like a wolf" because he never slept soundly but appeared to be always "listening and watching" so that no one could catch him approach and asleep.

At the time among the peaks were the paleface the tribe signified that the

then supposed to be the highest of the range, bear his name. The Indians complied with his wish and the mountain ever since has been called "Rising Wolf"—the name in the Indian mind commemorating their old time friend, Hugh Munroe, who became a Blackfoot and who slept and got up quickly on his hands like a wolf.

#### Going-to-the-Sun Mountain

With a gigantic face of stone, like the profile on a silver dollar, Going-to-the-Sun mountain will attract the admiration of the Glidden tourists. It was named after Sour Spirit, among the Blackfeet a mystic creature who came to earth from the lodge of the Sun in a prehistoric day to teach the Indians how to trap buffalo in the "pound" or brush corral, how to tan hides, build the tepee, and in fact, how to make and do the things that the redskins needed in order to live in comfort.

Sour Spirit was a most benevolent necromancer with wonderful powers of magic and entitled to the utmost respect. The Indians say that he was turned to stone when his spirit went back to the lodge of the sun after his work of teaching was completed and that the stone face is left on the mountain to show all non-believers that he had been on earth.

There is another mountain whose rough surface awakened in the Indian all of his powers of imagination, Abbe Kunny or Scabby Face mountain, named in honor of John Schultz, who came to Fort Benton as a boy, wooed and won a squaw and lived thereafter with the Blackfeet, leaving them about 1905 or thereabouts. It is evident that Schultz did not carry to the tepee of the redskin the razor, safety or otherwise. If he did, he never felt inclined to treat himself tonsorially, for he was called "Abby Kunny" or "Scabby Face" by the Blackfeet, who appear to have had a sense of humor and christened the mountain after their paleface, hirsute-faced brother.

#### Heaven's Mountain

There is another lofty peak named by the white man Heaven's mountain, which has been translated into the Blackfeet jargon into Ash-pay-stuht-oak-ky-Oh-chit-tow-pihp Meh-stuck or The-Maker-where-He-Lives mountain. Milk river bears a descriptive name because of the white color of the water that laps its rocky banks.

From Glacier Park Station to St. Mary's lake the Great Northern officials have constructed a \$65,000 motor road which winds its way through some of the most beautiful scenic spots in the park. The A. A. A. wanted the tour to finish at Kalispell, Mont.



THE NATIONAL TROPHY  
—TOURING CAR PRIZE



THE GLIDDEN  
—TEAM TROPHY PRIZE



THE ANDERSON TROPHY  
—RUNABOUT PRIZE

# Legislation Arouses Pennsylvanians

**HARRISBURG, Pa., April 5**—Motorists in this state are rallying around the Pennsylvania Motor Federation and the various dealers' organizations in their effort to stem the flood tide of motor-mad legislation now pending before the legislature here. Senator Buckman's bill is the bone of contention.

This bill was originally drafted by the Pennsylvania Motor Federation, but was changed in not a few respects before its introduction, so that in its present form it is being opposed not only by the federation but by all other motoring interests in this state. This bill has a new scale of registration fees for passenger cars and motor trucks. The fees for passenger cars are according to horsepower, and those for motor trucks according to gross weight. The following are the fees:

Passenger cars under 20 horsepower.....	\$ 5
Passenger cars, 20-50 horsepower.....	10
Passenger cars, over 50 horsepower.....	15
Motor trucks under 4,000 pounds.....	10
Motor trucks, 4,000-5,000 pounds.....	15
Motor trucks, 5,000-10,000 pounds.....	20
Motor trucks, 10,000-15,000 pounds.....	25
Motor trucks, 15,000-20,000 pounds.....	30

By this schedule the registration fees on motor trucks are more than doubled as compared with the present fees, but other bills have been introduced which make these fees \$30, \$50 and \$100.

This new legislation places further restrictions on motor trucks, in that the maximum weight of a truck with its load is 20,000 pounds or 10 tons, and that of this total not more than 15,000 pounds can be carried on one rear axle. This places a restriction on present methods of truck construction in which the total gross weight carried on the rear axle is sometimes 80 and as high as 85 per cent of the total gross.

There is at present a movement to get the maximum permissible weight on a truck increased to 25,000 pounds, but it is certain that this is being opposed by certain canal interests throughout the state which have many bridges not capable of withstanding such loads; and it is also being opposed by certain counties in which the old-fashioned type of covered wood bridge as constructed 60 years ago is still in existence. The present legislation goes still further and aims to restrict the overall width of a motor truck to 88 inches.

One interesting aspect of the present campaign is the fact that a traction engine company selling many traction engines in this state has circularized every county in the state, asking that the voters go against the present \$50,000,000 bond issue on the ground that traction engines with cleats on the wheels will not be permitted to use the improved highways.

## MISSISSIPPI TAG LAW HELD INVALID

**Jackson, Miss., April 5**—Mississippi may be called upon to refund \$30,000 collected for motor licenses. Judge William A.

## Motorists Fighting Attempt to Double Truck Fees

## MISSISSIPPI TAG DECISION

## Judge Holds Registration Law Unconstitutional

## IMPORTANT ILLINOIS RULING

Henry, of the Hinds county court, has ruled the law unconstitutional, stating that the collection is a tax, an outcome of class legislation. The question will be carried to the supreme court by the attorney-general who passed on the constitutionality of the bill before it was enacted by the legislature of 1912.

## TANGLE OVER TAGS

Washington, D. C., April 5—A sort of a tangle has arisen in the relations of the District of Columbia and the state of Virginia over the temporary permit section of the motor car law. The law provides that motorists from the district or elsewhere may visit the state twice each year for not more than 7 days each time without being required to take out the regular license. These temporary permits are supposed to be issued upon request.

It develops, however, that the secretary of the commonwealth of Virginia does not issue temporary permits. Governor Mann has had the matter up with the district commissioners and it is stated the latter have refused to enter into any reciprocal agreement and as a result motor car owners of this city, in order to use Virginia roads, must take out the regular Virginia license.

The Washington Motorists' Association, through its attorney, has taken up the matter with the district commissioners.

## IMPORTANT ILLINOIS DECISION

Bloomington, Ill., April 5—Illinois cities and villages, according to Attorney-General P. J. Lucey, cannot legally regulate by ordinance the speed of privately owned motor cars, although they can tax commercial cars. If the supreme court sustains this decision, the collection of fines by cities for violation of the speed ordinances will be illegal. There probably are few cities in the state which do not have a speed ordinance of some kind and which regularly practice the collection of fines for the violation. The opinion was handed down following a request from A.

W. Schaefer of Pekin and construes the law of 1911. It is state-wide in its scope.

The attorney-general, in reviewing the law in its several sections, contends that cities can legally collect a tax or a license from persons who operate motor vehicles for public hire, or commercialized motor cars, but he holds that a city cannot enforce an ordinance which relates to the rate of speed of motor vehicles except in the case of such vehicles in public use.

Attorney-General Lucey cites a construction of the law of 1911 placed by the supreme court in the case of the People vs. Sargent. In this case the power of the city of Chicago to license drivers of commercial motor cars was the issue. The case sustained the license feature but the attorney general construes that the court did not intend to convey the idea that cities had power to regulate, by ordinances, the speed of private machines.

The state law provides speed regulations for private-car drivers, and this, it is inferred from the attorney general's opinion, is sufficient.

The chief effect of the attorney-general's opinion is to stamp as illegal the collection of fines by cities, which fines are paid into city treasuries for speed violations. In other words, it is left to the state to prosecute all cases of offending speed violators.

## JERSEY INSISTS ON RECIPROCITY

New York, April 7—The motor authorities of New Jersey are doing their best to enforce the 15-day limit for foreign cars entering the state. Two inspectors are stationed at the ferries which carry cars from Manhattan to New Jersey and other inspectors check incoming and outgoing out-of-state cars in other places. The inspectors meet regularly, and by comparing their records determine what cars pass the 15-day limit for free travel in Jersey, so that their owners may be requested to take out Jersey licenses. The state legislature had adjourned without taking any action of the various motor measures proposed to it.

## TEXAS' MOTOR LEGISLATION

Austin, Texas, April 5—The legislature, at its recent regular session, passed the following laws affecting motor cars:

An act permitting fire insurance companies of Texas to insure motor cars and power trucks.

An act levying an annual tax on motor cars and providing for the use of this fund for the improvement of public highways.

An act creating a state highway commission and providing for the construction of an extensive system of public highways.

An act making it unlawful for any person to throw glass, bottles, nails, tacks or any other article that might prove damaging to motor car tires in a public road.

An act authorizing the formation of corporations to construct and maintain motor car toll roads.

An act making it an offense for any one to take or use a motor car or other vehicle without the owner's consent.

An act making it an offense and providing a fine of not more than \$500 for any one to obstruct or damage a public road or street.







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# MOTOR AGE

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## Fair-Play Taxation Wanted

**T**HERE is pending before the Ohio legislature a bill providing for double taxation of motor cars. Ohio is not the first state that has imposed double taxation on motor vehicles. Citizens of Illinois have paid double taxation for several years, they have paid the annual registration tax, and in addition a wheel tax for the privilege of using the streets and alleys. The same is true in some other states.

**T**HERE is another example of double taxation which is enforced in some states in the union, namely, an annual registration fee and also a personal property tax on the car. In some other states, where an annual registration fee in excess of the cost of registration has been imposed, the motorists have been sufficiently alert to have it specified that it would be in lieu of any personal property tax that might be collected against the vehicle. New York is one example of this. In Pennsylvania there is a heavy annual registration fee but that state has not any personal property tax, so that so far as the motorist is concerned there is not double taxation.

**E**FFORTS at double taxation of a motor car as well as attempted restrictions upon it are nearly universal in all the states of the union today. Each legislative session seems to be looked upon as incomplete without a great many bills for the regulation of motor vehicles. The majority of these bills have been prompted by the desire to get more revenue under the pretense that the motor car destroys the road and consequently annual registrations must be increased to pay for this destruction. To a certain extent such is correct, and to a certain extent incorrect. In certain territories, and they can be found in nearly every state in the union, the roads are entirely destroyed at this season of the year, and this destruction has been brought about by horse traffic during the winter period, because motorists have not used the roads during such a period. Here is an example, and a very apparent one, of road destruction by horse vehicles, and yet these same vehicles are permitted to use the highways 365 days in the year without the payment of any registration fee or a personal property tax. It is unfair to tax motor cars by way of annual registration fee in excess of the cost of identification, or by way of wheel tax, or by way of personal property tax, when all other types of vehicles, including traction engines with cleats on the wheels, are allowed to go tax free. If the motor car is to be taxed, then all vehicles using the highway must pay their just proportion. This means horse vehicles, traction engines, horses for horseback riding, motorcycles, bicycles, farming implements, etc.

**L**EGISLATORS have gone motor-mad during the last few years solely because they have realized that the motorist has been a man of compromise. In several states the motorists accepted an annual registration fee, which is in excess of the cost of identification, solely because they desired some rational form of control. At the start, a perpetual license was granted. At the next session of the legislature additional revenue was needed, and the perpetual registration was changed to an annual registration. At the succeeding legislature the nominal annual registration fee of \$2 or \$3 was determined by horsepower, and became \$5, \$10 or \$15. At the following session of the

legislature additional revenue, and the thought of road construction, brought forth a fee of 50 cents per horsepower. So the story goes. Then came motor trucks. At first they paid nominal annual registrations, but this year the legislators have pointed their guns at these business vehicles, and are at present trying to put the fees of annual registration, in some cases, as high as \$100.

**E**VERY motorist must acknowledge that the present form of annual registration of motor cars is illegal when the registration fee is in excess of the cost of registration. Legislators know this also. Motorists must agree that their actions of compromise in the past have been errors in that they have resulted in the annual crop of unreasonable legislation; and further that this compromising propaganda will continue until the motorists unite and take the matter to the supreme court, where it will be decided for the entire country whether motorists will pay annual registration fees and all other users of the road go tax free.

**P**ENNSYLVANIA at present offers a typical example of what other users of the highways will do in order to increase the registration of motor cars and actually work against the movement for better highways. Certain traction engine interests have circularized the entire state of Pennsylvania requesting the electorate to use its influence to defeat the present bill providing for a \$50,000,000 good roads bond issue on the ground that traction engines with cleats on the wheels will not be allowed on the improved highways, and because of such these interests favor the construction of dirt roads in preference to improved types. Where could such an echo of medievalism be found in any other movement? When traction engine interests will go so far as to positively work against good roads is it not time that all motorists should unite and see that modern movements are presented to the public of the various states in their true light?

**T**RACTION engines are in use in England, France, Germany, and other parts of Europe. They are on the highways every day and they do not use cleats on the wheels. They are compelled to have exceedingly broad driving wheels. Their weight is rationally restricted, and only a stipulated amount of weight can be carried on each of the trailers, so that roads are not needlessly destroyed. What Europe has done to regulate traction engines, on its improved highways, America must do. Not a traction engine with cleats on its wheels should be allowed on an improved American highway, and motorists should make every effort to defeat movements which tend to permit the destruction of highways by such wheels.

**T**HIS warfare of motor-mad legislators is going to continue. The campaign has centered in half dozen states during the past 5 months. The legislation passed in these states will largely be imitated in other states at the sessions of next year. Because of this each state must feel that it is not a factor unto itself, but bears a relationship to every other state in the union. In a word, the co-operation of all the states is at present necessary in order that adequate and just motor legislation shall be entered upon the statute books.



## Reports on Convict Labor

### Colorado Saves \$223,479 on Road Construction in 1912

COLORADO SPRINGS, Colo., April 5—Colorado's employment of convict labor on its roads has proven highly successful and is a factor that is rapidly bringing that state to the fore in the development of a highway system. According to the report of the warden of the state penitentiary, T. J. Tynan, 157 miles of roadway were constructed during the last biennial period at an estimated saving to the counties of \$223,479.56.

The convicts have been employed largely upon the mountain and more difficult roads, and the model highways they have constructed have stimulated road improvement and development in every section of the state and have given Colorado a nation-wide reputation for its increasingly good roads.

Two of the mountain roads which have attracted widespread attention are the state highway between Colorado Springs and Canon City and the Lincoln highway through Ute pass west from Colorado Springs, Colorado City and Manitou. Touching upon the road work, Warden Tynan says in his report:

Our largest item of labor performed by the convicts was, of course, the road work. The prisoners have been employed in the construction of roads in Mesa, Fremont, Larimer, Weld, Boulder, Jefferson, El Paso and Pueblo counties. They have built 157 miles of good roadway, and a great deal of this has been blasted out of solid rock—that in Mesa county being the most difficult and heavy work ever attempted by our men.

Owing to the fact that it was impossible to get from the various counties the cost of material, such as cement, lumber, steel, corrugated culverts, powder, tools and supplies, other than actual labor, used in road and bridge building we are enabled to give you only the labor cost to these different counties for the work of the men. This work has been done at an average cost to the different counties of 32 cents per day per man, and, as this cost includes Sundays and holidays, the cost of the labor of these men to the counties for the 2 years, or 731 days, would be \$36,725.44. We have worked twenty-one state teams, and the feed for these teams cost the counties \$20 per month per team, which would amount to \$10,080; making a total cost to the counties for labor of \$46,805.44. The average labor cost for the 157 miles was \$298.12 per mile.

It is hard to estimate the immense value of these roads for the reason that the work in Mesa county alone would have cost, with free labor, not less than \$25,000 per mile, as the rock in places had to be blasted for 75 feet in order to get a proper road bed. In this work it was necessary to drill holes 25 feet deep and to drill three depths before the road bed was reached. So you can readily see the magnitude of this work.

The work in Ute pass, in El Paso county, was done through solid rock for 6 miles, all blasting. The work in Salt canon and Parkdale hill, in Fremont county, and Ingree hill, Cherokee hill and Thompson canon, in Larimer county, all contained a great deal of blasting. This necessarily would have been very expensive work had it been done with free labor, and the counties would have been forced to pay big salaries for drillers, blasters, powder men, masons and cement workers.

Not counting what the contractor's profit might be and not including any skilled labor, except blacksmiths, cement workers and masons, and estimating the cost of free labor at \$2 per day, by eliminating Sundays and holidays, we may count 132 men working 610 days at \$2 per day which would give us a labor value of \$161,040. We have worked an average of twenty masons and cement workers, which would have cost the counties \$5 per day, and would have amounted to \$61,000. We have averaged five blacksmiths, whose labor is estimated at \$4 per day, and this would have amounted to \$12,220.

Estimating the value of twenty-one teams at \$2.50 per day per team for 610 days, it would amount to \$32,025. At a low figure the value of the labor of these men and teams

would be worth to the counties \$266,285. Add to this a depreciation of state equipment \$2,000, and the interest on state equipment, \$2,000 and you can see that this labor has been worth to the different counties \$270,285. The difference between what the free labor alone would have cost the public—namely \$270,285—and what the labor of our men actually cost them, shows a labor profit of \$223,479.56. However, this labor did not compete with the free labor of the state, for the reason that the counties could not otherwise have afforded to do this work.

Convicts at work on the roads and in camp are allowed much of the freedom of the ordinary camp, and are placed on the honor system. There is only one unarmed guard on duty at each camp at a time. The practicability of this plan has been demonstrated by the small percentage of escapes attempted during the years the work has been carried on. Care, of course, is exercised in the selection of men for road work and a certain amount of time is deducted from the convicts' sentence for each day's work on roads, this being in addition to the regular allowance for good behavior.

## Entries for Big Events

### 500-Mile Sweepstakes

To be run on the Indianapolis speedway, May 30.

No.	Car.	Driver.
1.	Stutz	Anderson
2.	Stutz	Merz
3.	Nyberg	H. Endicott
4.	Keeton	Burman
5.	Mason	
6.	Mason	
7.	Unknown	
8.	Stutz	Herr
9.	Sunbeam	Guyot
10.	Henderson	Knipper
12.	Fox Special	Wilcox
14.	Smada	Adams
15.	Peugeot	Zuccarelli
16.	Peugeot	Goux
17.	Schacht	Jenkins

### CHICAGO-BOSTON RELIABILITY

A day and night non-motor stop contest promoted by the Chicago Automobile Club, to be run June 25-29.

No.	Car.	Entrant.
1.	Packard	E. C. Patterson
2.	Abbott-Detroit	A. M. Robbins
3.	Abbott-Detroit	Abbott Motor Co.
4.	Staver-Chicago	Thomas J. Hay
5.	Staver-Chicago	Staver Carriage Co.
6.	Imperial	Imperial Automobile Co.
7.	Imperial	Imperial Automobile Co.
8.	Case	J. I. Case T. M. Co.

### INDIANA-PACIFIC TOUR

Promoted by the Indiana Automobile Manufacturers' Association, starting from Indianapolis July 1.

No.	Car.	Entrant.
1.	American	American Motors Co.
2.	American	D. S. Menasco
3.	Henderson	Henderson Motor Car Co.
4.	Henderson	R. P. Henderson
5.	Stutz	Ideal Motor Car Co.
6.	Stutz	Harry Stutz
7.	Marion	Marion Motor Car Co.
8.	Marion	Marion Motor Car Co.
9.	Marion	J. I. Handley
10.	Premier	Premier Motor Mfg. Co.
11.	Premier	H. O. Smith
12.	Haynes	Haynes Automobile Co.
13.	Haynes	C. B. Warren

### FRENCH GRAND PRIX

To be run July 12 over course at Amiens, France; distance, 560 miles.

1.	Sunbeam	Rigal
2.	Delage	Bablot
3.	Opel	Joerns
4.	Mathis	Mathias
5.	Excelsior	
6.	Th. Schneider	Gabriel
7.	Itala	
8.	Peugeot	Bolliot
9.	Sunbeam	Callics
10.	Delage	Guyot
11.	Excelsior	
12.	Th. Schneider	Thomas
13.	Itala	
14.	Peugeot	Goux
15.	Sunbeam	Guinness
16.	Th. Schneider	
17.	Itala	
18.	Peugeot	Zuccarelli
19.	Sunbeam	Resta
20.	Th. Schneider	

## Cars Ready for Indianapolis

### Foreigners Finish Tuning Up for 500-Mile Speedway Race

PARIS, March 29—Training for the Indianapolis race, Albert Guyot spent considerable time on Brooklands track this week with the six-cylinder Sunbeam. Guyot declares himself thoroughly satisfied with the speed possibilities of the car, and was particularly pleased with the manner in which it holds to the ground.

The Sunbeam racer will be packed and sent to Liverpool at the end of April for shipment to New York by cargo boat. The driver will sail from Havre, in all probability, on May 3 by the French line steamer, arriving in New York about May 9. It has been decided that Guyot will have as his mechanic, Crossman, an Englishman.

Another visitor to Brooklands at this time was Jules Goux with one of the grand prix Peugeots, practically identical with the pair preparing for Indianapolis. Goux took part in the Easter handicaps with this car, and in the short handicap came in first from scratch at an average speed of 95½ miles an hour. In two following races, starting scratch with an increased handicap, he came in second at an average of over 100 miles an hour.

It is in this car that Goux intends at a very early date to make an attempt on the records now held by the Talbot and Percy Lambert. The racer at Brooklands is the identical car which won at Dieppe last year. The only change is the fitting of a wind-cutting body. The Indianapolis racers differ by having a bore of 108 millimeters instead of 110 millimeters. The stroke remains unchanged at 200 millimeters. Goux, Zuccarelli, and their mechanics doubtless will sail from Havre at the same time as Guyot. The Peugeot mechanics are Emile Begin for Goux, and Ernest Flanelli for Zuccarelli. The French race drivers will be accompanied on their American trip by Charles Faroux, editor of La Vie Automobile.

### SEALED-BONNET TEST COMPLETED

Philadelphia, Pa., April 5—Tuesday of next week will wind up the 30-day sealed-bonnet test being conducted by the Automobile Club of Philadelphia. A resume of the test as so far completed shows a total mileage of more than 5,000, twenty distinct club routes traversed and over 200 roads surveyed. During the past week the Multiplex car chosen for the test has been to and from the following cities: New York, Baltimore, Norristown, Valley Forge and a 3-day New Jersey end-to-end run, during which 546 miles were covered.

### SCHACHT ENTERS 500-MILE RACE

Indianapolis, Ind., April 7—The seventeenth entry for the 500-mile race is a Schacht, which will be driven by Johnny Jenkins, who piloted the White in the 1912 sweepstakes.

# New Tariff Bill Cuts Duty on Chassis

Reduction from 45 to 30 Per Cent on Imported Machines Without Bodies Proposed—Ball and Roller Bearings to be Dropped from 45 to 25 Per Cent—Views of Leaders of Motor Industry in Matter

WASHINGTON, D. C., April 8—Special telegram—Under the new tariff bill introduced today many reductions are made in motor cars and parts as well as in raw materials that go into the make-up of cars.

On chassis imported the present duty of 45 per cent ad valorem is cut to 30 per cent, but complete cars made up of chassis and body remain at the 45-per cent mark. On finished parts going into the make-up of a car the reduction is still greater, being from 45 per cent to 20 per cent.

On ball and roller bearings the tariff is cut from 45 to 25 per cent. Other reductions include axles and parts, chains, rough forgings, malleable castings, steel ingots, iron in stages between ingots and bars, iron ore, welded tubes, flexible tubing, cylindrical tanks, and a score or more of other articles as enumerated in the schedule herewith in which the tariff under the new Underwood proposed plan is in one column and the present tariff under the Payne schedule in the other.

## COMPARISON OF PAYNE AND UNDERWOOD TARIFFS

Article—	Payne	Underwood
Motor cars, finished....	45%	45%
Motor car bodies....	45%	45%
Motor chassis .....	45%	30%
Finished parts except tires .....	45%	20%
Axles and parts.....	3c lb.	10%
Chains .....	3c lb.	24%
Cylindrical tanks .....	30%	20%
Flexible tubing .....	30%	20%
Bolts, blanks, nuts, washers .....	1½c lb.	15%
Special nut locks and washers .....	¾c lb.	35%
Iron in stages between pigs and bars except castings, much bars, bar iron, square iron, rolled or hammered..	3c lb.	8%
Round iron in coils, rods, bars or shape rolled or hammered..	6c lb.	8%
Hoop or band iron and steel mfd. ....	3c lb.	Free
Iron and steel plates and sheets .....	1 to 10c lb.	20%
Steel ingots and similar shapes .....	7-40c lb to 20%	10%
Iron or steel made abrasives .....	1c lb.	30%
Steel and wire rods...	6c lb.	10%
Cast iron pipe.....	2c lb.	20%
Iron castings advanced but not finished....	2c lb. plus 7c lb.	10%
Malleable castings....	7c lb.	10%
Lead bearings, ores of all kinds .....	1.5c lb. on lead in it	5c lb on lead in ore
Files and file blanks, rasps .....	25-77c doz.	25%
Rivets .....	45%	20%
Bearings and parts...	45%	35%
Rough forgings, iron and steel .....	30%	25%
Machined tools .....	30%	50%
Misc. articles, fe., cu., nl., zn., al or other metals, n spec. ....	45%	25%
Tarroll spreader for roads .....	30%	Free
Nails .....	.4 to ¾c lb.	Free
Welded tubes, from corr. or plate.....	2c lb.	20%
Other iron and steel tubing .....	30%	20%
Lap and butt-welded, seamed and joined iron and steel tube and pipe .....	1 to 2c lb.	20%

Iron ore .....	15c ton	Free
Iron, pigs, Kentledge, Spiegele, Isen .....	\$2.50 ton	8%
Wrought and cast scrap iron and steel.....	\$1 ton	8%
Ferromanganese .....	\$2.50 ton	15%
Ferrosilicon .....	\$5 ton to 20%	15%
Lead dross, lead bullion, base bullion, old refuse run into bars and blocks fit only for remaking .....	2.125c lb.	25%
Zinc-bearing ores, all kinds .....	Free if less than 10% zn.; if more, .25 to 1c per lb.	10%
Zinc metal .....	1.625c lb.	10%
Zinc in sheets.....	1.75c lb.	10%
Zinc, old and worn out	1c lb.	10%
Aluminum .....	7c to 3c lb plus 25%	25%
Castor oil .....	35c gal.	15c gal.
Litharge .....	2.5c lb.	25%
Zinc, white oxide....	1c lb.	10%
Paints, colors, pigments .....	30%	15%
Pumice .....	25c lb.	5%
Mica trimmed only..	5c lb. plus 20%	30%
Mica and mica products .....	10c lb. plus 20%	30%
Electrodes brushes...	30%	25%
Grindstones .....	\$1.75 ton	\$1.50 ton
Guttapercha and India rubber, including products .....	35%	20%

## Gist of Importers' Brief

The attitude of the importer of foreign cars is expressed in the brief submitted by E. Lascaris on behalf of the Automobile Importers' Alliance at the hearing on January 10 before the committee on ways and means.

In this brief it was suggested that the duty of 45 per cent on finished cars was prohibitive and no longer necessary. This view was supported by the fact that where 781 cars were imported up to December 1, 21,700 cars were exported.

In the importers' brief protest was made against the classification of the motor car as a luxury, it being claimed the product of the fourth largest industry of the country is used as a matter of necessity by doctors, farmers and the world at large.

The importers were of the opinion that a duty of 25 per cent would be more fair to all concerned than the present 45 per cent. At the suggested rate the importers pledge themselves to import 3,000 cars at an approximate value of \$6,810,000. On this amount the duties would be \$1,702,500. At the present rate of duty the value of the parts imported is 15 per cent of the value of the total import, but with the reduction asked the increase in parts imported would raise the revenue from parts alone, \$255,000 as far as a reduction in price to the consumer is concerned, if the Underwood schedule went into effect.

Mr. Lascaris stated in his brief that the average price for the year of 1912 of the foreign car was \$2,275; the average price of the exported American article is \$1,000;

the average selling price of the foreign vehicle in America is \$4,500; the average selling price of the American vehicle is \$3,000; the difference represents the duty and freight, 50 per cent.

To the importers of ball and roller bearings the proposed cut is disappointing, as they had requested a reduction of possibly 20 per cent. The importations of ball bearings for use in motor cars is an important item, and the briefs filed by the importers before the committee of ways and means at Washington show that approximately 75 per cent of the ball bearings used in American cars are imported. The brief further states that approximately 80 per cent of the ball bearings manufactured in Germany are exported to America.

The figures show that during 1912 anti-friction bearings were imported to the gross value of \$1,508,939, which, on the 45 per cent schedule, paid a duty of \$679,022.55. To this sum freight to the extent of \$75,446.95 has to be added, giving a grand total for the year of \$2,263,408.50 as the gross value of foreign ball bearings, including duty and freight when landed here. This brief further shows the steady increase which has been made in the importation of anti-friction bearings within the last few years. The figures for custom receipts are: 1908, \$57,000; 1909, \$193,000; 1910, \$597,000; 1911, \$487,000; 1912, \$679,022.55.

## HOW DETROIT VIEWS TARIFF BILL

Detroit, Mich., April 8—There appears to be very little concern among the Detroit manufacturers of motor cars as to the contemplated reduction of import duties on products used by the motor car industry. While it is yet quite early for any of the heads of the industry here to formulate any conclusive opinions as to the effects of the new Wilson tariff bill, it is the consensus of opinion of the half-dozen prominent makers interviewed today that the proposed reductions would make little or no difference to the industry as a whole.

Imported products used today in motor cars are less than 1 per cent, as compared with those obtained from domestic sources. The greatest percentage of parts imported are ball bearings, which probably amount to from a half to two-thirds of the number used in American cars.

The makers in this country are very much better equipped to make moderate-priced and cheap cars than are the Europeans and hence very material tariff reductions would have little or no effect in this direction.



However, this would not hold true in other industries, which are not so well-equipped for cheap production, such as woolen goods manufacturers, and so on. The reductions will have no appreciable effect upon car cost, although raw metals, such as aluminum, nickel, antimony, lead and so forth would be imported at slightly less cost than under the present tariff schedules. However, the importations of these products by car manufacturers are in the minority as compared with those obtained here at home.

James Couzens, secretary and treasurer of the Ford Motor Co., states that from his limited knowledge of the bill, it will have no effect whatever upon the industry as a whole and that his company will make no opposition to such tariff reductions.

Hugh Chalmers, of the Chalmers company, would make no comment, as he had not gone into it enough to form an opinion as yet.

Walter E. Flanders, president of the Maxwell Motor Co., does not believe the industry will be affected.

H. B. Joy, president of the Packard company, states that it is impossible, in so short a time, for him to formulate any serious and intelligent opinions as to the effects of the new bill in detail.

"Any person must know," he says, "that when the bars are let down the cattle and hogs will get into the corn fields. Just so, greater imports will take place under reduced tariff in many lines of industry. Only time can prove just how serious this will be. It is self-evident that when goods are purchased from abroad, American employes and products in these articles are curtailed to that extent. However, why worry, since business is good?"

R. D. Chapin, president of the Hudson company, states that with the information at hand he can see no detrimental effects of the bill on the motor industry. Importations of forgings and castings do not amount to anything, and while possibly half of the ball bearings used are imported, very many of the bearings used in present-day American cars are of the roller type and little or none of these are imported. He does not believe that congress will effect any reduction in the tariff on motor cars, since cars are still classed as luxuries, and congress is not disposed to reduce the revenue on articles in this class.

#### AS IMPORTERS VIEW CUT

New York, April 8—Special telegram—The views of importers of complete cars on the tariff reduction are best expressed in the brief which they presented before the ways and means committee some months ago, asking for reductions on chassis and parts. The present reduction in tariff would mean much to the purchaser of an imported car. In most cases it would amount to one-half of the difference between 45 per cent and 30 per cent; in other words, 7½ per cent.

The Benz importer says that reducing the duty on a chassis from 45 to 30 per cent would cause a material reducing of prices. A 36-horsepower model now costing \$5,600 probably would be reduced to \$5,000. Similarly with commercial motor vehicles. A truck listing at \$6,000 probably would be reduced to \$5,300, and other trucks chassis selling at \$5,250 could be cut to \$4,500.

The Metallurgique people announce that with the present practice of importing complete cars from France, the prices on his cars would not be influenced. There is a possibility of a Belgian body builder opening a factory in this country, which would permit the chassis to be imported and bodies built in this country, under which arrangement there could be a reduction of \$500 in the price of a \$6,500 car.

#### BLUE BOOK SUES A. C. A.

New York, April 7—The Automobile Blue Book Publishing Co. has filed suit, in the district court of the United States, southern district of New York, against the Automobile Club of America, alleging infringement of the latter of the copyright granted on various editions of the several volumes of the Blue Book.

The bill of complaint tends to show that the Tour Book of the Automobile Club of America, published in recent years, and, according to the Blue Book, to be published again in 1913, utilizes the information gathered laboriously by the editors of the Blue Book and compiled in this publication. It is claimed that the information thus collected and published has been rearranged and put in a new guise.

After lining up the preliminary evidence the bill of complaint prays for a perpetual injunction restraining the A. C. A. from publishing and selling the Tour Book, the sale of which, it is claimed, actually injures the business of the Automobile Blue Book.

#### TIRE PRICE REDUCTION

Chicago, April 8—The motorist's tire bills will be reduced slightly this season as a result of the new schedule of prices adopted by several of the tire concerns on April 1. Only two of the larger companies, the Republic Rubber Co. and the Kelly-Springfield Tire Co., have decided to maintain their former schedules and stand pat on the old prices. The Michelin Tire Co. has not met the Goodrich reduction as yet, but according to the local representative will reach a decision by the end of this week. The American agents are awaiting word from the French house before making an announcement.

Like the Goodrich company, the Goodyear and Firestone makers have included all pneumatic casings in their new schedule. The manufacturers of the Fisk and United States tires have confined their price reductions to the smooth tread cas-

ings. The Empire price cut is limited now to the plain tread tires, but a reduction in the non-skid type is pending, according to the local branch.

Two reasons are advanced for the Goodrich price reduction; first, the low cost of crude rubber, which is now quoted at 88 cents, and, second, the general use of automatic machines for the manufacture of tire casings, whereby all the fabric is laid and stretched by machinery, a saving in the cost of production of 25 cents per casing.

Following is the standing of most of the rubber companies at the present time on tire price reductions:

Republic Rubber Co.—Has issued statement to effect that cannot change price and keep quality of tires the same.

Firestone—Price list has been completely revised so that the prices are lowered to the consumer 5 per cent.

United States—Reduction of 5 per cent to consumer on plain treads; no reduction on non-skids.

Michelin—No change whatever.

Fisk—Only a single price list now. Price has been lowered to consumers about 5 per cent.

Kelly-Springfield—Nothing has been done as yet.

Ajax-Grier—Reduction of 5 per cent to consumer.

Swinehart—No change.

Pennsylvania—Reduction of 5 per cent to consumer.

Empire—There is to be a reduction probably about the same as that of the other companies but this has not as yet been determined.

#### NEW MILLION DOLLAR COMPANY

Chicago, April 9—Formation of a \$1,000,000 corporation to be known as the Church Motor Car Co., recently incorporated in Delaware, has just been announced. It will manufacture passenger cars and trucks, using the Church pneumatic system automatic motor, which has been developed by the Automatic Motor and Engineering Co., Chicago. The incorporators of the new Delaware corporation are A. G. Latter, W. J. Malony and N. P. Coffin.

Manufacture of cars in quantities will commence in Chicago immediately and it is expected to have the first model on the street by the middle of May and deliveries will commence, according to present plans, by September 1. Efforts are being made to obtain a factory site in Detroit and the permanent plant will be established in that city, the Chicago factory being only temporary.

The car will be radically different from existing types so far as power plant is concerned, as it will employ the pneumatic motor and transmission system developed by Edmund S. Church. This involves a pneumatic clutch which takes the place of both clutch and gearset and also is automatic in that the ratio of engine speed to car speed varies automatically with the load. The system at the same time provides for pressure fuel injection, pneumatic starter and tire inflator and pneumatic tire jacks. It is stated that the engine handles not only gasoline but kerosene and even crude oil as fuel. The motor is a four-cylinder, 3½ inches bore and 5 inches stroke and rated by the maker at 90 horsepower. The car is to be sold for in the neighborhood of \$2,500.



# Compare Worm and Bevel-Drive Axles

## Detroit Engineers Have Lively Discussion as to Relative Merits of Two Types

**D**ETROIT, Mich., April 4—The annual business session of the Detroit section of the Society of Automobile Engineers was held last night in connection with the regular monthly meeting. Officers for the ensuing year were elected, as follows: Chairman: E. T. Birdsall; vice-chairman, C. E. Cox; secretary and treasurer, H. A. Connell.

The report of the secretary and treasurer showed that at present the section has 147 members and that cash on hand and in the bank totals \$515.27, with no outstanding debts.

Following the business session, technical matters were taken up. The first talk was given by R. T. Wingo, of the Superior Machine and Engineering Co., Detroit, Mich., and was a comparison of worm and bevel drive axles, which was characterized as being an exceedingly live subject just now. Mr. Wingo's remarks were confined chiefly to the shop end of the question of final drives. Many worm constructions have failed, due to several adverse conditions, and hence many engineers condemn them all. It is the same with the successful type. When one proves to be efficient, many consider them all equally good.

In the motor-driven motor vehicle many conditions govern worm and worm-wheel drives, said Mr. Wingo. If the teeth are adjusted so as to be in correct relation to each other, they very often do not stay where they are placed. The fallacy is in making no provision for permanency of adjustment. It was advised that for best results, adjustment should be provided for both members and for locking these after once properly set.

Methods of manufacture of various types of worm gearing were taken up and the best ways of cutting the members were pointed out. The Hindley and the Lanchester types were discussed and a third design also was mentioned. This latter resembles the Hindley, but it really very much different, in that the worm and worm wheel, as ordinarily considered, are reversed, the wheel in this case being the smaller member. This combination gives an oiling arrangement which is said to be very satisfactory.

Mr. Wingo is in doubt as to the best efficiency of the three types, but on numerous occasions has found it to be about 92 per cent in the best cases. The rather remarkable figure of 99 per cent has been reached by Mr. Wingo with specially constructed bevel gearings, having ball thrusts. This, he stated, ordinarily should be nearer 97 per cent, while with machinery of the ordinary type, it has been estimated at about 75 per cent.

In closing Mr. Wingo made the rather startling statement that the worm gearing

must come for trucks, while for passenger cars it is on the decline, due to the greater perfection of bevel gearing and its lower cost of manufacture, for equal efficiency. The reason that it is essential to trucks is that these have a lower gear ratio and slower speeds, and it is easier to properly proportion the parts and provide for lubrication for this slower running. The passenger car offers the disadvantage of too great average speed.

The final discussion of the evening was that by E. J. Stoddard, member of the nomenclature division of the society. He spoke of the very great importance which the skidding factor has on motor car construction. It was the consensus of opinion that skidding is a much bigger consideration than the average engineer believes. Mr. Stoddard's talk was short, and consisted mainly in the presentation of a problem, which, he stated, has obsessed him for some time, relative to the apparently different rates of travel of the forward and rear ends of a motor vehicle in skidding around a curve.

### RIMS WILL BE TRIED OUT

New York, April 7—In developing standard dimensions for rims the passenger car wheel division of the standards committee of the Society of Automobile Engineers has not run against any difficulty which is not surmountable. At the meeting last Wednesday afternoon a report was read which stated that the variations in diameter and fellow width did not exceed .125

inch and .25 inch respectively, and that standard limits of toleration were possible. The work is now in the hands of the subcommittee on the ways and means of carrying on future tests which are necessary before definite action can be taken. This committee is expected to report at an early date.

About seventy-five tests have to be run and a good pressure line needed to make tests on various types of straight side and beaded tires in connection with the different forms of rims. These tests are apt to cost a large amount of time and to be expensive on account of the tubes and casings needed. The specimen rims are now all at the headquarters of the S. A. E. in this city and as soon as the subcommittee has reported the additional work will be taken up.

### TO TEST WORM DRIVE

London, Eng., April 1—The Daimler Co. Ltd., has issued a challenge through the Autocar to makers of the straight or parallel-side type of worm gears for an official efficiency and endurance test against the Lanchester hour-glass type of worm made by that company, and has offered its testing machine for the purpose. With the coming of the worm gear rear axle there has arisen a controversy as to the relative efficiency and lift of the straight and hour-glass types of worms. Heretofore it has been impossible to clarify the atmosphere and obtain the real facts because the only testing machine in existence capable of the necessary degree of accuracy to decide the question is the Daimler-Lanchester machine owned by the Daimler company.

The probabilities are that there will be definite data on the question within a few weeks, as it is considered certain

## S.A.E. Arranges for Summer Meeting

### Session at Detroit Will Include 4-Day Cruise on Great Lakes in June

**N**EW YORK, April 4—Arrangements for the summer meeting of the Society of Automobile Engineers practically have been completed with the exception of some of the minor details. The chief feature of the meeting will be the visit of members of the Institution of Automobile Engineers and of the Society of Motor Manufacturers and Traders of England. This visit is upon invitation of the S. A. E. in return for the hospitality shown the members of the society during their European trip last year.

The summer meeting begins June 4 and consists of a 4-day cruise upon the City of Detroit III, the largest fresh-water passenger steamer afloat. The semi-annual meeting of the society will be held on board the vessel. This is in response to a very general demand consequent upon the success of the last summer meeting,

which was held on board a smaller vessel en route from Detroit to Mackinac Island and return.

This year's plans embrace a more extended trip. Leaving Detroit June 4, a landing will be made at Sault Ste. Marie the following day. After passing Mackinac island the steamer is to follow the northern shore of Lake Huron to the entrance of St. Mary's river where the government locks around St. Mary's rapids will be inspected. The return trip includes a stop at Mackinac island and the party will disembark at Detroit in the afternoon of June 7.

Proceedings of the society, both professional and business sessions, will be held upon the steamer. A banquet at the Ponchartrain hotel on June 3 in honor of the English visitors, opens the social part of the meeting.

that the challenge will be accepted by one maker, at least, David Brown & Sons, who are one of the chief exponents of the straight type of gear, and against whom the challenge is directed in particular.

A worm testing machine has been offered formally by the Daimler Co. to the National Physical Laboratory as a gift. The challenge is open until April 22 and is first, on the basis of efficiency and, second, a test to destruction. The challenger puts up the sum of \$1,000, half on each test, and the firm accepting the challenge is to put up a like amount.

#### U. S. RUBBER INCREASES DIVIDENDS

New York, April 7—The United States Rubber Co. on April 4 declared a 15 per cent quarterly dividend on its common stock, instead of the conventional 1 per cent. This puts the stock on a yearly 6 per cent basis, instead of the former 4 per cent, which dividend rate had been maintained since October, 1911.

Although the April 1 report is not complete as yet, President Samuel P. Colt of the company gave out a statement in conjunction with the dividend-increase notice that after all dividends paid for the fiscal year there would still remain a surplus of from \$1,500,000 to \$2,000,000.

The 2 per cent dividend on the first preferred and the 15 per cent on the second preferred stocks were declared as usual.

#### OWEN WORKING ON GEARSHIFT

New York, April 7—R. M. Owen and Paul Rainey, the former racing driver, are experimenting with an electric transmission mechanism, which is to do away with individual clutch and gearset. The experiments, however, have not reached the point where details may be given out.

## French Enjoying Big Export Business

First 2 Months of 1913 Shows Increase of \$1,875,180 Over 1912

PARIS, March 29—French motor business has been very satisfactory during the first 2 months of the present year, according to the returns just issued by the financial authorities. The total value of the motor exports is \$7,242,840, compared with \$5,367,660 for the corresponding period of 1912. The increase therefore is \$1,875,180.

There has been increased business with all nations but the four following: England, Switzerland, Austria, and America. The decrease with England is \$72,520 for the 2 months, and although Great Britain still figures as the most important customer of France, she is followed by Belgium with only \$80,000 less, which is a fine showing.

While exports have increased, imports have also been on the rise. In 1912 the figures for the first 2 months were

## National Commercial Shows Dropped

### Makers Decide to Give Up Truck Exhibitions in New York and Chicago in Future

NEW YORK, April 7—The executive committees of the N. A. A. M. and Automobile Board of Trade, at their meetings Thursday, reached the decision that no more truck shows are to be held in New York and Chicago hereafter. This action has been foreshadowed repeatedly ever since the closing of the shows in these two cities this year, and now has become definite.

Incidentally, the two bodies decided that it would be of advantage to hold one large passenger car show in New York instead of two, and it was decided to exhibit all the cars, during a 1-week show, in the Grand Central Palace, where plenty of space is available, while the Madison Square Garden has proved more and more inadequate during the last few shows.

While in previous years the ground floor and two stories of the palace were used for car exhibitions, for 1913 three additional floors will be devoted to this purpose, giving a total of six floors. Each of these has 55,000 square feet, making a total of 330,000 square feet. If necessary, even more space could be provided. The palace has ample elevator facilities so that the show will be as easy to review as if all the cars were on one or two floors.

The merger of the N. A. A. M. and the Automobile Board of Trade into the Automobile Chamber of Commerce, although scheduled for last week's meeting of the N. A. A. M. was not effected, a slight obstacle having been interposed that delayed such action for a month.

At the N. A. A. M. meeting the resignations of Alfred Reeves, who has gone from the car to the accessory trade, and S. D. Waldon, of the Packard Motor Car Co., were accepted and J. N. Gunn, general manager of the Studebaker Corp., and Alvin Macaulay, general manager of the Packard company, were elected to fill the vacancies on the executive committee. C. Arthur Benjamin also was elected to membership as a representative of the American Locomotive Co., in place of Harry S. Houpt, resigned.

#### SPARK PLUG PUMP SUIT FILED

Chicago, April 5—Claiming patent infringement on a spark plug pump, the Mayo Mfg. Co., Chicago, has filed papers for suit in the United States district court against the Automobile Supply Co., Chicago. The patentee claims that the Brown spark plug pump sold by the Automobile Supply Co. has an air valve identical with that on the Mayo pump. The air valve is the only patentable feature of the pump and in both cases is said to be the same as regards dimensions, appearance, and mechanical operation. The case is on the calendar and will come up within a few days. Testimony has been taken in a similar suit of the Mayo company against Marshall-Field & Co., Chicago, who handle also the Brown pump.

#### OLDS PICKS MANAGING TRIO

Detroit, Mich., April 5—A committee of three will in the future direct the affairs of the Olds Motor Works, due to the recent resignation of General Manager O. C. Hutchinson. This advisory body will consist of Sales Manager J. V. Hall, Factory Manager E. B. Linden and Comptroller D. F. Edwards. The Olds plant, which is located at Lansing, Mich., is one of the General Motors group.

#### UNITED RIM COMPANY DISSOLVES

Detroit, Mich., April 9—(Special Telegram)—Officers of the United Rim Co., Akron, O., held a formal meeting Friday last and decided to dissolve. R. B. Beebe, its sales manager, was appointed trustee to wind up the company's affairs as soon as possible, which will be not later than June 1. The United Rim Co. has been a holding company, owning the rim patents of Goodyear, Goodrich, Morgan & Wright, Hartford, G. & J., Diamond, and Continental.

#### ALCO PREFERRED DIVIDEND DECLARED

New York, April 7—The board of directors of the American Locomotive Co. declared the regular 1.75 per cent quarterly dividend on the preferred capital stock, payable April 22, 1913.

\$282,060; for the 2 initial months of the present year they are \$431,580. The greatest increase has come from England, with \$60,000 value of cars. Germany follows, with Italy third. The United States stands low with only \$14,000 as its contribution to the French coffers.

The export figures for the countries figuring on the official list are announced as follows:

Country.	1913.	1912.
England .....	\$1,746,780	\$1,821,300
Belgium .....	1,663,200	1,104,840
Argentina Republic.	618,840	253,320
Germany .....	399,780	302,280
Algeria .....	375,400	477,000
Brazil .....	367,680	211,260
Italy .....	183,300	95,520
Russia .....	160,200	17,100
Spain .....	163,440	120,580
Switzerland .....	95,040	158,400
U. S. A. ....	90,120	110,640
Turkey .....	26,460	21,780
Austria .....		51,660
Other Countries ..	1,152,600	619,980
	\$7,242,840	\$5,367,660



# Railroads Recovering from the Flood

Tracks Being Restored and Bridges Rebuilt—Transportation Facilities Rapidly Being Restored to Normal—Indiana and Ohio Concerns Write Motor Age as to Existing Conditions Following the Inundation

**C**HICAGO, April 7—With large gangs of workmen laboring day and night rebuilding washed out tracks and bridges and restoring lines of telegraphic communication, losses from delayed shipments anticipated by the manufacturers of motor cars and motor accessories in the flooded districts of Indiana and Ohio will be reduced to the minimum, according to local railroad officials who are confident that traffic conditions will be normal by the end of the week.

"We are prepared to take care of all shipments," was an almost universal statement made today by the general freight agents of the lines operating in the inundated territory. The majority of railroads which suffered from the floods have about completed their repair work and in the few instances where rehabilitation is not yet possible, arrangements have been made to detour over the tracks of competing systems.

If any cities can be said to be isolated, they are Cincinnati and Dayton. The Baltimore and Ohio is not receiving shipments to either of these points and the Panhandle cannot run trains to Cincinnati or beyond at the present time. The Erie officials, however, have succeeded in opening their line from Dayton to Chicago and announced that they had started a continuous movement of freight this morning.

The Pennsylvania system which suffered the most damage at Piqua, Dayton, Columbus, Indianapolis and Logansport and on lines approaching these cities, opened up a through line to Pittsburg this morning and lifted the embargo on all shipments from and to points en route.

The Big Four has two divisions reopened, the Chicago division from Chicago to Lawrenceburg Junction tapping Lafayette and Indianapolis, and the Michigan division from Benton Harbor to Louisville by way of Elkhart, Wabash, Anderson and Shirley. This road also is giving freight service to Muncie by way of Indianapolis.

The Baltimore and Ohio is accepting freight from Cleveland and Columbus shippers and hopes to give Dayton and Cincinnati the same service before the end of the week.

Neither the Lake Shore nor Michigan Central was affected by the rampaging waters except in regard to small connecting lines. The majority of these have now been repaired and freight embargoes are very few.

Bulletins received at local railroad headquarters announce the constant addi-

tion of more territory every hour and verify the prediction that conditions will be normal by the end of the week.

The motor industry in the flood zone also is rapidly recovering from the ravages of the high waters. In almost every case where a factory was flooded, order has been restored and the manufacture of cars and accessories now is going on as it was before the inundation.

Letters sent to Motor Age by manufacturers in Ohio and Indiana tell of the general resumption of business. These letters give specific details and are interesting. Herewith are excerpts which give an accurate line on the situation as it is now:

## INDIANAPOLIS, IND.

**American Motors Co.**—The plant of the American Motors Co. sustained no damage whatever from the flood further than a slight inconvenience for a day on account of the city water being shut off. Production was handicapped somewhat because some of the employees resided in the flooded district and others were unable to get to the factory because of the discontinuance of street car service but it will not be delayed. There is a possibility that shipments will be held up because of crippled railroad service and the fact that the railroads are accepting freight only on condition that they will not be held responsible for damages, no matter what the cause.

**Cole Motor Car Co.**—The flood did no damage whatever to the Cole plant owing to its location. Production was tied up for 3 days on account of lack of city water service and shipments were delayed 3 days.

**Diamond Chain Mfg. Co.**—The flood did no damage to the plant of this company and shipments were held up only for 3 days.

**Duckwell Belting & Hose Co.**—The factory of this company was not damaged by the flood but lack of adequate railroad facilities delayed shipments.

**Henderson Motor Car Co.**—The Henderson plant was left high and dry above the flood and no loss was suffered. The only inconvenience was a shut down for 3 days because of a lack of water supply for the factory boilers. Cars were loaded on 2 of the 3 days the factory was closed and the shipping schedule was set back only 2 days on account of the high water.

**Henricks Novelty Co.**—This plant has been running right along as usual as it is without the flood district but shipments have been delayed because the transportation companies have been more or less crippled by washed out bridges, etc.

**R. J. Irvin Mfg. Co.**—Ten feet of water in body factory. Production stopped temporarily but plant now is running to full capacity.

**Link Belt Co.**—Floods did not do any damage to this plant and the factory was run during the high-water period although somewhat short-handed. Production will not be delayed but shipments were.

**Lyons Atlas Co.**—Our motor plant is located on high ground and not in the flood zone. Production not stopped by crippled city water service as pumping apparatus is installed in the factory.

**Mais Motor Truck Co.**—Plant did not suffer at all from the rising water. Flood held up production and shipments and delay may last from 2 to 3 weeks depending entirely on how soon the railroads and bridges are repaired and rebuilt. Number of employees suffered loss from water entering their houses and plant was operated with small force for a few days.

**Marion Motor Car Co.**—The Marion factory is located on the White river but protected from its ravages by a very strong and high levee. The plant, therefore, did not suffer greatly from the flood except in the interruption of factory operations. Some water entered the plant at the rear and on the lower floor but precautions had

been taken to move everything which might have been damaged the day previous to the partial inundation of the city. Some castings and metal work were submerged but not at all injured, and the chief delay was occasioned by the lack of telephone, water and street car service. Shipments will go forward rapidly as soon as railroads open up.

**National Motor Vehicle Co.**—Flood did not damage the National plant in the slightest and plans for the immediate future are just the same as they were before the flood. Conditions are normal and we will be able to make immediate deliveries.

**Nordyke & Marmion Co.**—The Marmion plant was partially submerged but before the flood came the employees succeeded in removing practically all the finished product, considerable material, records, drawings, patterns, etc., to places of safety. No buildings were damaged. We believe we will be in a position to make shipments and fill all orders promptly by the time the railroads are ready to accept freight.

**Oakes Co.**—The plant was not damaged and production or shipment was not delayed.

**Motor Car Mfg. Co.**—The Pathfinder plant suffered little or no loss except in time. Factory started with full force April 1.

**Premier Motor Mfg. Co.**—The Premier plant was fortunate in being located on high ground and in no way suffered from the flow of waters.

**Prest-O-Lite Co.**—The greatest damage done to this plant through the flood was through the interruption of all railroad and traction transportation service. Manufacturing is now done at new factory near the speedway and while the physical damage to the plant was practically nothing the power was shut off and manufacturing was stopped temporarily.

**Rockwood Mfg. Co.**—Our motor factory is located on high ground 2 miles from the flood district and was not affected in any way. No interference with production but shipments from Indianapolis delayed by washouts.

**Ideal Motor Car Co.**—Located on high ground, the Stutz factory was not affected by the floods and the production was not delayed in the slightest. The only difficulty experienced is that railroads are not in position to handle outbound freight but this untoward condition is gradually being overcome.

**Waverley Co.**—The Waverley plant was not in the zone of the flood and no damage resulted.

**Wheeler & Schebler**—Floods did not come anywhere near factory and no loss was suffered. Plant was shut down 5 days that hospitals and relief stations might get water from the company's wells. Production will not be delayed in the slightest but railroad congestion may delay shipments. This delay will not be serious.

## KOKOMO, IND.

**Apperson Bros. Automobile Co.**—A small creek on a rampage forced us to close down the plant for 24 hours, but excepting that hiatus in production, no untoward effect from the heavy rains have been noticed. Production or shipments will not be delayed.

**Byrne, Kingston & Co.**—Factory not damaged by the flood. Production delayed 2 or 3 days by crippled power and light. Plant now running full force and shipments being made.

**Kokomo Electric Co.**—Flood did not damage factory and delay in production caused by failure to railroad companies to deliver supplies. Small financial loss suffered from plant being shut down during time power and water plants were out of commission.

**Kokomo Rubber Co.**—Officials were not forced to close down factory and only inconvenience experienced was lack of shipping facilities which are now in normal state.

**Long Bros.**—Factory being situated on high ground above rampaging Wild Cat creek, no loss sustained and production and shipments were delayed only for a short time.

**Planhard Mfg. Co.**—Factory was not damaged by flood but we fear that a large number of patterns, sent to Dayton in order that castings might be made there, have been lost.

## Hoosiers Look Into Future Indianapolis Prepares to Similar Prevent Floods Hereafter

INDIANAPOLIS, Ind., April 7.—The city engineering department has begun a survey of White river from Thirty-eighth street to Southern avenue, with a view to widening the channel and building levees for future protection from high waters. The portion of the river to be improved is approximately 5 miles in length and the cost will doubtless reach \$1,000,000. The cost is to be met by an assessment on all property benefited, with the exception that the city will pay about \$150,000 of the cost itself by a bond issue.

In many places it will be necessary to condemn land, where there has been an encroachment of the banks. There has been a conflict of authority for years, the United States government in 1787 declaring the stream to be a navigable one while the Indiana supreme court in recent years has held it is not navigable. As a result many manufacturing concerns have filled in along the river banks and added to their holdings.

There is to be a driveway on either bank on the levees to be built and these driveways will be turned over to the board of park commissioners for improvement as boulevards.

Concerns identified with the motor car industry that were in the path of the flood are rapidly recovering. It is believed the total loss to motor car interests will not exceed \$100,000.



### PERU, IND.

**Brown Commercial Car Co.**—Water flooded one-story factory but part of the stock was protected.

**Great Western Automobile Co.**—The factory escaped serious damage and started up March 31 with a small force which will be increased as rapidly as the employees, who lost all of their personal effects in the flood, can get back. Shipments have been resumed.

**Model Gas Engine Works**—Aside from a brief shut-down the loss is of but little consequence and will in no way prevent the company taking care of all contracts. The factory was started up March 31 and a full force was employed 2 days later.

**Peru Electric Mfg. Co.**—The factory was damaged but slightly by the flood and production was resumed the first of last week. Shipments will be delayed for another week or 10 days.

### CONNERSVILLE, IND.

**Empire Automobile Co.**—Factory was not situated in the flooded district but was compelled to close down for a few days because of a coal shortage. This is now passed and railroad shipments out of Connersville were resumed April 3.

**Howard Motor Car Co.**—The company's plant was not damaged in any way and the only loss suffered is due to the cutting off of all railroad connection and the fact that the line over which most of the raw material is received will not be in operation for a period of from 10 to 30 days. This delay will unquestionably affect the company's production to some extent.

**McFarlan Motor Car Co.**—The flood did not damage the McFarlan plant at all and our plans for the immediate future are to get out as many cars as possible and that production will not be held up one moment. Shipments were resumed April 1.

**W. W. Wainwright & Son**—The factory was not damaged in the least and production was held up only 3 days.

### LAFAYETTE, IND.

**Ross Gear & Tool Co.**—Six feet of water stood between the factory and serious dam-

age, but the plant was uninjured. Plans for the immediate future are not affected in any way by the flood and production and shipment will not be delayed.

### MARION, IND.

**Rutenber Motor Co.**—Although within 2 feet of the building the flood did not damage the Marion factory but the foundry at Logansport, 40 miles west, was flooded to an average depth of 3 feet and operations cannot be resumed there for another week. The Marion factory was shut down for 2 days when there was no power.

### FORT WAYNE, IND.

**Wayne Auto Axle Co.**—The flood did not damage the plant in any way excepting by indirect interference due to the absence of the city water supply. Shipments at the present time will not be hampered but may later owing to the slowness of the raw material getting in.

### MUNCIE, IND.

**Inter-State Auto Co.**—The flood did not reach the Inter-State factory and production was stopped but 1 day because the water works' pumps were submerged. The railroads are rapidly recovering from the flood and have resumed shipments. Conditions are now normal.

### ANDERSON, IND.

**Nyberg Automobile Works**—Neither the factory nor the stock of the Nyberg company suffered a loss from the flood. After a delay during the time of high water the plant now is running full force and the officials are confident of turning out all the cars scheduled for delivery this season. The railroads running into Anderson, as well as the interurban lines, are now in full operation.

### RICHMOND, IND.

**Pilot Car Sales Co.**—Although within the heart of the flood area the Pilot factory was not damaged by the raging waters of the White river. The company has plenty of material on hand to take care of immediate production and a large amount of supplies in railroad yards nearby. At the most, shipment delays will not extend over a period of 10 days.

### DAYTON, O.

**Air Friction Carburetor Co.**—Although the company's offices were flooded the damage to the factory was not serious and production was resumed April 1.

**Apple Electric Co.**—Our plant was not seriously damaged, only the machine shop and battery department being under water. Our plans are not materially changed by the in-

## Toledo Waits on Railroads Business Will Become Normal With Transportation Restored

Toledo, O., April 5.—Now that the waters in the flooded sections of the state have subsided and the plants have had an opportunity to begin the work of cleaning up and to form some intelligent estimate of the actual loss to plants, garages, etc., it is believed that the greatest losses will be from the delay in shipments on account of the railroads' inability to make deliveries.

All but one or two of the steam and electric roads out of Toledo were out of commission for the handling of freight for a period of several days and this has formed a congestion in manufacturing plants of all kinds which is a serious matter. The property and equipment loss at the factories in the submerged districts it is estimated will reach something above the million mark, but none is severely crippled and all will be able to resume business within a few days.

Shipments south of Toledo cannot be made as yet and it is thought it will take a fortnight yet before the situation will be cleared up.

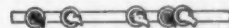
## Ohio Is Becoming Normal Buckeyes Are Slowly Recovering from Effects of Flood

COLUMBUS, O., April 1.—Business in motor circles in Columbus and other flood-ridden sections of the Buckeye state is slowly resuming its normal condition. In Columbus the plant of the Columbus Buggy Co., which suffered some damage from the flood, is being put into condition and the receiver gives assurances that the plant will be ready for operation as soon as litigation is over. The steps for reorganization are said to be progressing satisfactorily. The damage done the plant was less than \$15,000.

The garage and sales room of Jacob Renner on West Broad street was almost entirely destroyed, although Mr. Renner, who was agent for the Richmond, has taken steps for another shipment of cars. Several new cars were destroyed.

The past week has been a bad one in Columbus from the standpoint of sales as the flood overshadowed everything else. Sales agents and distributors however believe that more sales will be made soon and that the flood will not affect them so badly as was at first believed. More interest is being shown in motor cars every day.

In Dayton, as the work of restoration continues, it is seen that the damage done car manufacturing concerns was not as large as first believed. There will be a heavy damage, however, as several of the plants were flooded to a great depth.



undation, as the departments in question have been thoroughly cleaned and we expect to be running by April 7. The shipment of our products will not be seriously delayed except by the transportation companies which are not as yet accepting shipments. We have a considerable stock of lighting dynamos and storage batteries on hand which were not reached by the flood and these can go forward as soon as the railroad companies are in shape to accept them.

**Speedwell Motor Car Co.**—Operations were resumed at the Speedwell plant Monday morning. The factory was not touched by the rising waters although surrounded on all sides. Lack of electric power for factory operation and trolley service prevented the resumption of production until the first of the week. The plant has no facilities for receiving materials or shipping cars as the Big Four is badly crippled on both sides of the factory. The delay in deliveries is expected to last two weeks and possibly longer, depending upon the ability of the railroads to re-establish shipping.

### YOUNGSTOWN, O.

**Republic Rubber Co.**—The flood did not affect the company's factory operation although nearly all the other plants in Youngstown were under water. We will be able to take care of all orders but shipping facilities are temporarily affected.

### COLUMBUS, O.

**Jeffrey Mfg. Co.**—The company's factory escaped the flood and while it has been operating every day with reduced forces because some of the men were searching for relatives and friends while others were aiding in the relief work, we are pushing orders. Express and freight shipment was resumed April 1.

### SPRINGFIELD, O.

**Kelly-Springfield Motor Truck Co.**—Although the factory was not damaged by the rising water the flood will seriously interfere with the company's business and it will be some time before we will be able to receive shipments or material or send away trucks.



# The Story of Motor Spirits, New Fuel

## Making Rival of Gasoline from Fuel Oil

By P. C. Crenshaw

General Manager Sales Department Standard Oil Co. of Indiana

**T**HIS is a story of a wonderful discovery, a very interesting story, too—interesting in more ways than one. Primarily interesting because it means a very material saving in dollars and cents for motorists and others who use gasoline or other liquid fuels for internal combustion engines.

The name "Motor Spirits" is merely descriptive of a fluid for use in gasoline engines and conveys but very little information as to what the article really is. Briefly stated, it is a product of an entirely new method of manufacture or distilling, but we will tell you more about this later.

When Motor Age heralded the advent of Motor Spirits with the statement that it would be sold at practically 3 cents per gallon less than gasoline, many were skeptical, feeling that the news was too good to be true, and naturally felt that even if the information were correct as to price that there was something wrong with the quality. To relieve your mind at once on this point we will state at the outset that the information as to price is correct, and with the exception of a slight odor, and the fact that the color is not quite water white, there need be no misgivings as to the quality—but this is getting a little ahead of our story.

### How Motor Spirits Is Made

Gasoline is made, as everyone knows, by distilling the crude oil and taking off the lighter products. Other products then are made by further distillation, until finally there is a residue left that heretofore has been marketed only for fuel purposes at a price in competition with coal. For a great many years the chemists have known that this residue, or fuel oil, contained a large amount of material similar in composition to gasoline, but of a much higher boiling point. Notwithstanding the vast amount of experimental work that has been done, the problem of converting high boiling-point products into low boiling-point products by a practical method baffled every effort.

It is true that the necessity for a greater production of gasoline has become imperative only within the past year. Prior to that the refineries were able by the ordinary methods to produce enough gasoline to meet all requirements, but with the constant increase in the number of gasoline engines and the growth of the motor car industry, coupled with the decrease in the production of crude oil, an acute condition has been brought about within the last year. Necessity is ever the mother of invention; with the urgent necessity of an increased yield of a fuel for internal combustion engines came the

solution of the vexing problem, and the discovery of the process by which Motor Spirits is made.

To detail the long series of experiments, the many failures that came when success seemed to be at hand, covering a period of more than 3 years, would be but to repeat the history of every epoch making discovery. The discovery of Motor Spirits will mark an epoch in the gasoline engine industry.

### Motor Spirits Disperses Fear of Famine

Before its discovery the fear of a shortage of the fuel supply for internal combustion engines hung as a cloud over the industry, with the further fear that the price would reach a prohibitive figure. With the advent of Motor Spirits both of these fears are dissipated. An abundant supply of fuel seems to be assured for a number of years hence at a comparatively reasonable price.

As stated above, Motor Spirits is made from what was formerly known as fuel oil. It is extracted by the process of pressure distillation. Under this process it is possible to secure about as many gallons of Motor Spirits from a given amount of crude run as now are obtained of gasoline, thus the total production of fuel suitable for gasoline engines practically can be doubled. Of course this takes time. The process requires an extremely expensive plant installation—several times as expensive as is necessary in the ordinary refining process.

The operation likewise is expensive, but as rapidly as the stills can be built they are being erected at the huge refineries at Whiting, Ind., and Alton, Ill., owned by the Standard Oil Co. of Indiana.

It will take several years to reach a point where a maximum amount of production can be secured, but the progress that has been made and is being made in the erection of these stills seems to give assurance that the supply of fuel will keep pace with the demand. The purpose of putting Motor Spirits on the market is to furnish the consumer a product that has the greatest efficiency at the lowest possible price. This is carrying out a fixed policy of the Standard Oil Co. The success of the company has been due largely to the fact that it has always furnished better goods for less money. Its constant effort has been to save the consumer money.

Motor Spirits could be refined further, deodorized and a product could be obtained therefrom that would be identical in every way with gasoline, but to do this would bring up the cost of the product to the present price of gasoline. This would accomplish no good purpose. The odor, whilst

pungent, is not necessarily disagreeable; it is simply a distinctive odor peculiar to Motor Spirits. It is noticeable only when handling the liquid. The exhaust from an engine is not as offensive as is the exhaust from gasoline. You can ride in a motor car using Motor Spirits and not detect it. The color is of but little moment. We have learned to expect gasoline to be water white. The fact that Motor Spirits is slightly yellow has no bearing on its efficiency for power purposes, any more than if it were green or blue. There are other disadvantages in further refining this product.

There are certain inherent properties in Motor Spirits that are desirable for power purposes that would be taken out in refining, principally the low boiling points which make the starting of the car easy, for it is a fact that in cold weather a car can be started easier with Motor Spirits than with gasoline. There is also more power in Motor Spirits than there is in gasoline, and further refining would destroy this advantage, so that there is everything to be lost and nothing gained in seeking a product from Motor Spirits that would look a little prettier and smell a little sweeter. As is the case with gasoline, it is desirable to use a chamois filter for filling to avoid the presence of moisture.

### New Fuel Will Be Popular

No one who has ever used Motor Spirits will care to go back to the use of gasoline, unless he is somewhat finicky as to the smell. It, of course, should be thoroughly understood that Motor Spirits is not intended for use in lamps or stoves—it is not suited for these purposes.

There is no type of internal combustion engine in which Motor Spirits will not perform as well or better than gasoline. It is a conservative statement that it will produce 10 per cent more power. This, coupled with the lower cost, means a saving to the user of at least 25 per cent. It is not necessary to use a different carbureter, but it will be found best to make a slight adjustment of the carbureter, either by reducing the amount of Motor Spirits, or increasing the amount of air admitted to the carbureter.

Provision for storing Motor Spirits is being made through the entire section in which the Standard Oil Co. of Indiana operates. This in itself is a huge problem, but every effort is being made to supply the trade as rapidly as possible so that the consumer may have the benefit of this saving. The trade can now be supplied, even in the most remote sections by making shipments in iron barrels from distributing points. Of course this will make some little reduction in the saving where local freight has to be paid, but there is still sufficient saving to warrant the consumer in using Motor Spirits for motor cars or trucks in preference to the older and more familiar petroleum product, gasoline.

NEW YORK, April 7—Action that possibly will mean more to the motorists of the country than any other one step taken by the industry is the agreement entered into last week between the National Association of Automobile Manufacturers and the Society of Automobile Engineers to cooperate in the immediate investigation of the fuel and carburetor questions.

After quietly studying the gasoline situation for the past 3 months the N. A. A. M. has found sufficient grounds to warrant a thorough investigation of automobile fuels, including the immediate applicability of kerosene and other low-grade petroleum products and the possibilities of developing substitutes for gasoline itself. Special arrangements have been made with the S. A. E. whereby the latter organization will undertake the more technical features of the investigation, including possibly a not inconsiderable amount of research work. The movement is significant in that it is the first definite response of the industry to the repeated and insistent complaints of motorists throughout the country during the past 9 or 10 months. That it will bring ultimate relief seems assured from the fact that the fuel problem is recognized by the manufacturers themselves as a question involving in some measure the future welfare of the industry.

#### Europe Already Investigating

This action is similar to that undertaken in England about 1 year ago by the Royal Automobile Club of Great Britain, but it is hoped that the results of the investigation on this side will be more immediate and decisive than those of the English organization. The latter has issued several reports on the use of various fuels, notably benzole, a coal tar product, but does not seem to really have accomplished anything toward relieving the condition of the fuel market over there.

At a conference with the council of the S. A. E. held early last week in New York, at which President William E. Metzger and General Manager Samuel A. Miles, of the national association, were present, a plan of action was sketched out by which the S. A. E. is given full authority to arrange for whatever scientific research the needs of the investigation may disclose. Such matters as may be of a purely commercial nature naturally would fall more properly within the scope of the normal activities of the association itself.

While definite announcement of the details of the plan have not been made public, it is stated officially that it will embrace both fuels and carbureting devices. To whatever extent may be deemed necessary, the ground already covered by the special fuel committee of the national association will be gone over again in an effort to determine exactly the status of the petroleum industry, particularly with reference to reserve supplies of petroleum at present held underground and the pos-

## Fuel Question Arouses National Bodies

### N. A. A. M. and S. A. E. Join in Seeking Relief

sibilities in the way of exploiting undeveloped oil fields.

Special opportunity will be given inventors and others who are interested in the development of new fuels as substitutes for gasoline to demonstrate not only their applicability to propulsion, but also the extent to which they can be produced and the probable relative cost. In this connection the investigators will study fuels such as the new Motor Spirits, recently placed on the market by the Standard Oil Co., of Indiana, and which is manufactured from a residue formerly marketed at a low price as fuel oil.

#### New Fuels Suggested

Coal tar, peat, and even vegetable refuse are possible sources of hydrocarbon compounds that may be used as fuel and are at present under investigation by various authorities, while several companies recently have undertaken the exploitation of fuels declared to be suitable as gasoline substitutes which are not directly dependent on the petroleum market, or which are entirely independent of it, as the case may be. Those interested in substitute products, as well as in new processes for increasing the yield of gasoline and similar products from petroleum itself, will be invited to place them before the investigators.

In a similar way, inventors of carburetors and other devices calculated to adapt the ordinary engine to the use of kerosene, distillate and similar low-grade fuels, will be given opportunity to demonstrate their merits to the satisfaction of the investigators. An important aspect of the work will be a study of carburetion methods at present employed with a view to determining what modifications are necessary in order to cope with the low-grade gasoline that is available at present, and pending possible relief, from whatever source it may be derived. President Metzger, of the national association, inspeaking of the investigation, said:

I consider this an important public work. It is for the benefit of the public quite as much as the motor car industry itself. They tell us that we are now getting 58 gravity gasoline, where a few years ago we were getting 64 and 68; and that it will continue to go down until within the next 5 years we will be getting as low as 50. Now that is something for which we must be prepared. It is not sufficient to develop our present product in such a way as to take care of these low-grade fuels, but we must look after the user. There are many thousand cars running today that will be still in use next year, and the year after, and we must see to it that they are provided with some sort of fuel to which they are adapted.

The oil people, with whom we already have been in conference, have explained their position very carefully to us, and have expressed their willingness to co-operate with us in carrying out this work. The national association itself, is fully competent to undertake the investigation, since the subject is one of so broad a nature and one so vital to the interests of all its members, and what is more, it is prepared to stand behind any conclusion that may be finally approved, in addition to lending its assistance to the work. And most important of all is the question of locating the fuel supply of the future. It will not be

long before we shall have to reckon on supplying 1,000,000 cars with fuel in the United States alone. So that it will not be enough merely to adopt kerosene carburetors, unless we can be sure that the supply of kerosene will increase as fast as the demand for it increases.

President Howard Marmon, of the S. A. E., who was detained in Indianapolis while getting his factory back into running order after a brief partial interruption by the flood, communicates his views of the undertaking briefly, as follows:

The development of improved methods of carburetion, particularly of methods applicable to heavier grades of fuel, is directly in line with the standardization work in which the society is so actively engaged at the present time, though somewhat in advance of any that is at present under way. Under our constitution, the society is not permitted to engage in any remunerative enterprise, nor is it permitted to approve or adopt any standards or formulas, nor to approve any commercial or engineering enterprise. It is, however, empowered to appoint committees to investigate any subjects coming directly within its field, and to approve or reject the findings of such committees.

For this reason it would be impossible for the society, or any committee delegated by it to undertake a study of the fuel question, to approve or recommend the design of any single form of carburetor, for example, or to approve or recommend any proprietary fuel compound, or any definite method or process of manufacturing a fuel. At the same time it is within the province of the society to undertake an investigation of the laws governing carburetion with a view to determining what physical or chemical properties are most desirable in a fuel and how best it may be applied, and to thus establish definite relations between the requisite velocities, volumes and temperatures.

Similarly, it is empowered to frame rules for standard methods of test whereby inventions or proprietary products may be investigated, and to publish the results of tests made according to such rules in its transactions. To do so, in fact, is one of its most important functions, since it arranges before its members the scientific facts concerning important matters in an orderly and authentic manner.

In undertaking the technical side of this investigation of fuels I feel that we are entering upon one of the most important tasks that has yet come within the province of the society. In conducting a purely scientific study of fuels and their application in the engine, we are not only performing a natural service to the society, whose membership is representative of the industry as a whole, but we are seeking to perform a public service which cannot fail to be of lasting benefit to a very great number.

#### TO MAKE MOTOR SPIRITS IN WEST

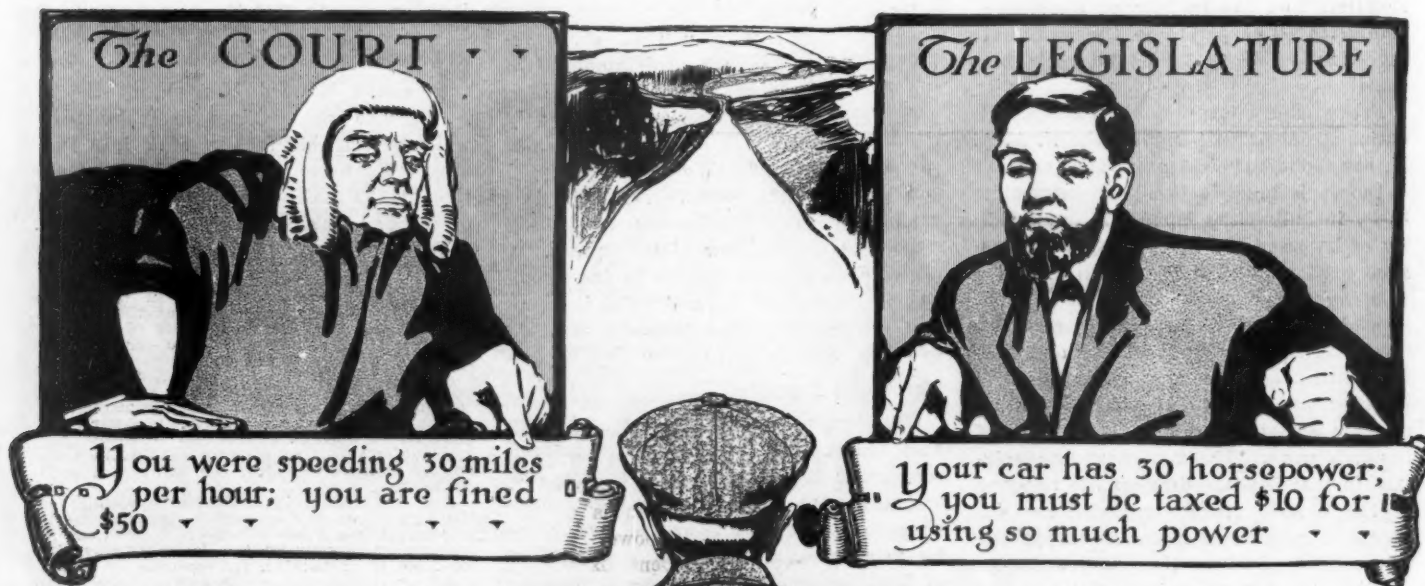
Chicago, April 5—A third refinery for the production of Motor Spirits, the new motor fuel, will be in operation by the first of next year. This refinery will be an addition to the present oil refining plant of the Standard Oil Co., at Neodesha, Kan. The addition, including the stills for the production of the new fuel, will represent an outlay of about \$200,000. Motor Spirits will be distilled by the Burton process of pressure distillation under royalties from the Standard Oil Co. of Indiana.

Two other refineries are producing the new fuel, one at Whiting, Ind., and the other at Alton, Ill. At the Whiting plant about \$2,000,000 worth of apparatus has been installed to produce and handle the Motor Spirits. The production of this plant is about 50,000 gallons of Motor Spirits daily and that of the Alton plant is about 10,000 gallons daily. The production of both plants is being increased as rapidly as new stills can be operated.



# How the Law Double-Crosses the Motorist

Tax Paid on Horsepower That Cannot Be Used Legally



THROUGH the ignorance of the state legislatures in motor matters owners are paying annually more than \$1,670,000, in excess of what they should because of laws which place a tax on horsepower and at the same time prohibit a speed high enough to allow the motor to develop the power upon which that tax is based. In order for the average motorist to get the benefit of the power for which he is paying the state, he has to exceed the legal speed limit. Thus the legislatures are setting a premium upon lawbreaking by motorists.

## Law Subsidizes Lawbreaking

Motor Age has gone deeply into the question of the license fees and speed limits and finds that there is not a state in the union in which a definite speed is set as the legal limit for the open country, that permits a rate of speed at which the average car will develop 25 horsepower on level country roads.

This all comes about from the fact that a gasoline engine has to run at a certain speed to give a certain power, that is, the faster the crankshaft revolves the more power the engine is giving. When on the road, the speed of the car depends upon how rapidly the engine is turning over and to keep down the speed of the car we have to slow down the engine.

What the relation between the speed of the car and the revolutions per minute of the engine crankshaft is, depends upon the size of the wheels and the number of times the engine crankshaft turns over to each revolution of the rear wheels. The latter is what is called the gear ratio.

But I have to go 30 miles per hour to use the 30 horsepower for which I was taxed

By Darwin S. Hatch

With a certain gear ratio, the speed of the engine is proportional to the speed of the car. For instance, an engine whose crankshaft turns over three and one-half times each time the rear wheels revolve, has a motor speed of about 1,025 revolutions per minute when the car is traveling 30 miles per hour. The motor speed is only 850 revolutions per minute at 25 miles per hour. This is as fast as any car is allowed to go in most states and few cars develop anywhere near their rated power at a crankshaft speed of 850 revolutions per minute on high gear.

A fair average of all the 1,000,000 cars upon which taxes are now being

paid would be one with a four-cylinder motor of about 4 inches bore and 5 inches stroke, with a gear ratio of  $3\frac{1}{2}$  to 1 and tires 35 inches in diameter. According to the laws of most states the owner would be paying for 25.6 horsepower. Such a motor must turn over at a little better than 1,300 revolutions per minute to develop the 25.6 horsepower on which he is paying a state tax. If he pays a tax of \$8, which is about the average vehicle license on a 25-horsepower car, he must keep motor running at 1,300 revolutions per minute to realize the power on which he is paying the tax. But to have his motor running at this speed on direct drive he would have to travel at a speed of 40 miles per hour.

By the laws of most states, however, he is not permitted to exceed a speed of 20 miles per hour anywhere in the state, so that he is paying a tax on twice as much power as he is allowed to use by the speed laws of the state. In other words he is paying approximately \$4 per year too much. While this does not mean very much to the motorist as an individual, it amounts to a vast sum when it is remembered that there are more than 1,000,000 cars in the country upon which taxes are being paid.

## Some Individual Cases

To take individual cases for instance, a motorist who owns an Abbott-Detroit of 4.5 by 5.5 inches bore and stroke would be paying taxes on a 32-horsepower car; but if he lived in South Carolina, could use only 15 horsepower without disobeying the speed laws. If he lived in Texas

he would be allowed to get only 18 out of his 32-horsepower motor and if he lived in Ohio or any other of the fourteen states limiting the speed to 20 miles an hour on the road he could develop only 20 horsepower.

#### Power Not Figured Correctly

License fees of most states are supposed to be based upon the horsepower of the motor as determined by the formula adopted as official by the Society of Automobile Engineers. By this formula, the power of a motor when the piston is moving up and down in the cylinder at the rate of 1,000 feet per minute, is found by squaring the bore of the cylinder in inches, multiplying by the number of cylinders and dividing the product by 2.5. As the formula is stated usually and as it is employed by the secretaries of state, the formula is taken without regard to the piston speed.

If the formula were used as it really is intended to be used, both the stroke and the crankshaft speed would affect the result. It has been found that the S. A. E. formula is very nearly correct for most motors if the power is taken proportional to the piston speed as originally intended. Taking the formula as applying only to motors at 1,000 feet piston speed and the power at other speeds as proportional to the piston speed, the latter can be divided into its factors of crankshaft speed and stroke and the power of any motor with any bore and stroke and at any speed figured by multiplying together the square of the bore, the stroke, the number of cylinders and the revolutions per minute and dividing the product by 15,000.

It is on this formula that the power of the different motors at the various road speeds have been figured.

The owner of a Winton six pays taxes on 48-horsepower car, but with the stock gear ratio and tire size on his car could develop only 22 horsepower in the 20-mile-an-hour states and 27 horsepower in the 25-mile-an-hour state. The highest speed limits set in any states are those in New York, North Dakota and Alabama. This limit is 30 miles an hour, and the

Winton owner could by running at the limit develop 32 horsepower, or two-thirds of the power for which he is taxed.

Owners of Ford cars do not fare so badly in the matter of abortive combination of license fees and speed limit as do some other owners. Ford owners are taxed for a 22.5-horsepower car. In the 30-mile-an-hour states he is using, at the speed limit 19 horsepower. In the 25-mile-an-hour states he can get about three-quarter of his money's worth. But in the 20-mile-an-hour states, which comprise a greater part of them he must break the speed limit in order to get more than half the power on which he is paying taxes if he is traveling on good level roads.

The man with a Hupmobile 32 is one of the few who is able to beat the game in any states which set limits to the speed. In the states where 30 miles an hour is the maximum permitted he is allowed to travel fast enough to be developing 18 horsepower, whereas on account of his small bore he is officially rated at only 16.9 horsepower.

#### Illinoisans Pay 30 Per Cent Excess

Suppose we return to the man with the average car with a 4 by 5 motor, which is rated by the official S. A. E. horsepower formula upon which the tax is based at 25.6 horsepower. If he lives in Illinois, it will cost him \$4 a year license fee or \$0.16 per horsepower. But he is allowed to travel at only 25 miles an hour and is developing to make this speed only 18 horsepower. That is, eighteen times \$0.16 or \$2.88 is the tax he pays for the horsepower required to run him up to the speed limit. The difference between this \$2.88 and \$4 or \$1.12 is the amount of tax the state collects in excess of what it allows him to use.

In all fairness, however, be it said that in Illinois, he would be quite likely to need all the power of which his motor is capable, on account of the chronic condition of the roads and on most of the highways of the state there would be little chance of his exceeding the legal limit. On the assumption however, that

his motor is used on good level roads, he would be losing \$1.12 every year.

Inasmuch as there are 48,000 motorists in the state who are averaging somewhere near this same difference between what they pay and what the state allows them to use in horsepower, the total excess amount collected from the motorists of the state each year is \$53,000.

Connecticut motorists fare worse in this respect than do those of any of the other states in the Union. The authorities of that commonwealth charge the individual owners an average of \$4.20 annually and the 17,000 owners of the state patriotically pay into its coffers the sum of \$73,000 for horsepower they never need unless they break the speed law or navigate roads or hills that require an extra pull from the engine. Motorists of Ohio, Virginia, West Virginia, Kentucky and Massachusetts are each paying an average of \$4 from which they get no return in speed if they keep within the law.

It is not suggested that the owner trim his sails in the matter of power in the attempt to make his tax conform more nearly with the double-barreled laws of the various states. Such a course would be likely to result in his having too little reserve power for emergencies, such as muddy or sandy roads or hills. The \$3 or \$4 extra that he pays the state each year is for the privilege of possessing that reserve of power which some day may pull him out of a hole which the state or local authorities have failed to fix up.

#### Would Build 280 Miles of Road

The grand total of this extra taxation from the motorists of the thirty-four states in which license fees are charged and speed limits set, amounts to the sum of \$1,670,000 annually. It is doubtful that motorists would object to the extra expenditure if it were all applied to such a use as the construction of roads. This amount would serve to build a highway of good macadam 280 miles in length, a distance equal that from Chicago to St. Louis, or Columbus, O., or from New York to Richmond, Va.

### Present Tax Rates on Average Car and Speed Limits in Various States

State.	30-MILE LIMIT.					No. of Cars Registered.	Total Excess Tax Collected in State.
	Tax Levied on 25 Horsepower.	Tax Levied per Horsepower.	Proper Tax to Speed Allowed.	Excess Collected.			
No. Dakota	\$ 4.00	\$ .12	\$ 2.64	\$ .36	8,941	\$ 3,200	
New York	10.00	.40	8.80	1.20	102,870	123,000	
25-MILE LIMIT.							
Connecticut	15.00	.60	10.80	4.20	17,429	\$ 72,000	
Illinois	4.00	.16	2.88	1.12	48,000	53,000	
Indiana	12.50	.50	9.00	3.50	52,048	182,000	
Iowa	10.00	.40	7.20	2.80	44,692	125,000	
Maryland	12.00	.48	8.65	3.35	10,687	36,000	
Maine	10.00	.40	7.20	2.80	24,858	70,000	
Michigan	3.00	.12	2.13	.87	39,235	34,000	
Minnesota	3.00	.12	2.13	.87	28,000	24,500	
Missouri	5.00	.20	3.60	1.40	24,151	33,800	
Nebraska	2.00	.08	1.44	.56	32,372	18,000	
No. Carolina	5.00	.20	3.60	1.40	6,090	8,500	
20-MILE LIMIT.							
New Jersey	7.50	.30	5.40	2.10	51,022	108,000	
Pennsylvania	10.00	.40	7.20	2.80	58,705	163,000	
Rhode Island	10.00	.40	7.20	2.80	9,332	26,000	
Washington	2.00	.08	1.44	.56	12,824	7,200	
Wisconsin	2.00	.08	1.44	.56	24,175	13,500	
Arkansas	\$ 5.00	\$ .20	\$ 3.00	\$ 2.00	3,616	\$ 7,232	
California	2.00	.08	1.44	.56	83,728	47,000	
Dist. of Col.	2.00	.08	1.44	.56	10,824	6,100	
Delaware	5.00	.20	3.00	2.00	2,035	4,070	
Kansas							
Kentucky	10.00	.40	6.00	4.00	3,718	4,800	
Mass.	10.00	.40	6.00	4.00	48,651	195,000	
Ohio	10.00	.40	6.00	4.00	63,550	254,200	
New Hamp.	10.00	.40	7.20	2.80	5,826		
So. Dakota	1.00	.04	.66	.34	3,616	7,232	
Tennessee	1.00						
Utah	2.00	.08	1.44	.56	2,690	1,500	
Virginia	10.00	.40	6.00	4.00	5,632	27,000	
W. Virginia	10.00	.40	6.00	4.00	5,197	20,788	
Total						\$1,670,280	



# Routes and Touring Information

## Answers to Route Inquiries from Motor Age Readers

### Britt, Ia.-Chicago

**B** RITT, IA.—Editor Motor Age—I would appreciate a routing with distance from Britt to Chicago. I expect to take the trip some time in May or June. Will I have to buy a route guide or is the road marked sufficiently?—R. H. Miller.

You, of course, know the routing to Mason City through Duncan, Garner and Clear Lake. To reach the Hawkeye highway at Ackley will necessitate routing south 49 miles through Rockwell, Sheffield, Hampton, thence going to Waterloo 42 miles east through Arlington, Parkersburg, New Hartford and Cedar Falls, and you should not experience any difficulty in routing without a guide book, particularly on the Hawkeye highway.

To reach Cedar Rapids you should travel 59 miles over a good road through Washburn, La Porte, Mt. Auburn, Vinton, Shellsburg and Palo. From Cedar Rapids into Chicago you will follow a sign-boarded road first 90 miles to Clinton through Marion, Mt. Vernon, Mechanicsville, Clarence, Lowden, Wheatland, Calamus, Grand Mound, De Witt and Elvira, and through Illinois 148 miles by way of Fulton, Morrison, Sterling, Dixon, Franklin Grove, Ashton, Rochelle, Creston, De Kalb, Geneva, Lombard, Elmhurst, Maywood and Garfield park.

### About California Roads

Jacksonville, Fla.—Editor Motor Age—Please give some information on the best route to California.—M. C. DeBevoise.

If you were given the southern routing from Jacksonville, and started out over it, most likely you would become discouraged before you finished the first half of the trip. One alternative would be to send your car by freight to Texarkana, Ark., which really is about the best thing you could do, that is if you want the southern route, which should be taken for an immediate trip.

On the other hand if you are planning on a summer trip to the coast, that is, July or August, you should come north to St. Louis and go west through Missouri and Kansas and through Colorado to the central transcontinental route at Cheyenne and on to the coast.

Jacksonville to Brunswick, Ga., is 100 miles over mostly fair dirt roads through pine barrens with an occasional stretch of deep sand. After leaving Calahan the King's ferry will take the car across the St. Mary's river into Georgia, charging \$1. Sixteen miles more and the Owen's ferry is needed, also with a charge of \$1. Tarboro, Brookman and Old Sterling land you in Brunswick.

About 14 miles can be saved by taking a short-cut to Sterling and Dent's Landing ferry, which will take you to Darien. This is an hour's trip and will cost \$5 for a single car. Shortly after leaving Eulonia you strike a bad stretch of corduroy road and cross several bridges to Riceboro, continuing to Midway cemetery, Freedman's Grove and Savannah. There is a fine gravel road leaving Savannah and from Blitchton to Stilson, Statesboro, Rockyford, Scarboro to Millen, then gravel again to Perkin, Waynesboro, McBean and Augusta. Return to Waynesboro and route to Atlanta through Louisville, Davidsboro, Saundersville, Mill-edgeville, Eatonton and Madison.

Atlanta to Nashville is a run through Marietta, Kennesaw, Cartersville, Rome, Summerville, Lafayette, Chattanooga, Rankins ferry, Jasper, Scottsboro, Larkinsville, Woodville, Gurley, Huntsville, Meridianville, Fayetteville, Shelbyville, Murfreesboro.

A new road through Kentucky will be found in the 1913 Blue Book routing through Clarksville to Paducah, crossing the Ohio by ferry into Illinois to Anna, Murphysboro and St. Louis. The first few miles out of Nashville are macadam, and the rest of the way natural dirt, but better than the Nashville-Louisville pike. There are two or three small fords which will give no serious difficulty except in very high water. The trip should not be attempted in wet weather due to the slippery clay soil which in some cases would make it impossible to get up the steep climb from one or two ferries. Unimproved dirt roads are encountered all the way to St. Louis, some parts are fairly good, but most of it rough.

In crossing Missouri your itinerary is Wellston, St. Charles, Dardenne, Foristell, Warrenton, Jonesburg, Danville, Mineola, Calwood, Fulton, Millersburg, Columbia, Rochepot, New Franklin, Arrow Rock, Marshall, Waverly, Dover, Lexington, Wellington, Levasy, and Independence.

The Golden Belt route through Kansas is the shortest road, and is over good natural dirt with some gravel and macadam. To Topeka the itinerary is—Muncie, Bonner Springs, Lenape, De Soto, Endora, Lawrence, Midland, Buck Creek, Perry, Grantville, Farramore, Topeka; Topeka to Salina—Morse, Silver Lake, Kingsville, Rossville, St. Mary, Belvue, Wamego, St. George, Manhattan, Ogden, Fort Riley, Junction City, Chapman, Detroit, Abilene, Solomon, Elm, Salina; Salina to Colby—Bavaria, Brookville, Carneiro, Kanapolis, Ellsworth, Wilson, Dorrance, Bunkerhill, Russell, Gorham, Walker, Victoria, Hays, Ellis, Waukeney, Collier, Quinter, Grainfield, Campus, Grinnell, Oakley, Mingo, Colby; to Limon, Colo.—Levant, Brewster, Goodland, Ruelton, Kanorado, Burlington, Muskoka, Stratton, Siebert, Flagler, Arriba, Bovine, Genoa, Limon; Limon to Denver—River Bend, Agate, Deer Trail, Peoria, Byers, Bennett, Watkins, and Denver.

A great many tourists would prefer the Santa Fe trail even though it is considerably longer. There are excellent hotel and garage accommodations along the trail the entire distance, and you pass through Emporia, Newton, Hutchinson, Ellinwood, Great Bend, Dodge City, Garden City, Syracuse, La Junta, Pueblo, and Colorado Springs to Denver.

Denver to Cheyenne, Wyo., where the transcontinental route is met is a distance of 117 miles and routes through Henderson, Brighton, Plattesville, Greeley, Ault, Pierce, and Dover.

For the balance of the routing you are referred to the Omaha-Los Angeles inquiry in the issue of March 27. The Blue Books cover the entire trip from Jacksonville to San Francisco and Los Angeles in their 1913 editions.

### Atlanta, Ga.-Indianapolis, Ind.

Baltimore, Md.—Editor Motor Age—I will be glad to have you publish the best route from Atlanta to Indianapolis and the distance between the principal points. If better roads could be given by going not exceeding 100 miles out of the direct route, I would rather route that way.—Reader.

The flooded condition of southern Illinois, Indiana and Ohio will render touring either difficult or almost impossible for some time to come. Probably the least difficulty will be experienced by a route to Chattanooga, Nashville, shipping the car to Mammoth Cave, then touring to Louisville and Indianapolis. Many small fords have to be crossed.

Atlanta to Chattanooga will be found 143 miles, extending through Marietta, Kennesaw, Cartersville, Rome, so named because of its seven hills, Summerville and Lafayette.

Chattanooga to Nashville, 247 miles, takes you through Jasper, Fackler, Scottsboro, Larkinsville, Woodville, Gurley, Huntsville, Meridianville, Fayetteville, Shelbyville, Murfreesboro and Nashville.

After shipping the car to Mammoth Cave you have 116 miles to reach Louisville, passing through Cave City, Bear Wallow, Cammer, Buffalo, New Haven, Bardstown and Mount Washington.

The direct Indianapolis road is a run of 125 miles, routing through New Albany, Henryville, Scottsburg, Caruthersville, Seymour, Waynesville, Columbus, Amity, Franklin, Greenwood and Southport.

### Memphis, Tenn.-Roanoke, Va.

Pine Bluff, Ark.—Editor Motor Age—Kindly give me a route including distances and road conditions from here by way of Memphis and Bristol, Tenn., to Roanoke, Va. Is this route given in the Blue Book?—B. Harvey.

You can route to Roe through Stuttgart, from which point you will find running directions the balance of the way to Roanoke in the Blue Books. Volume 5 will take you to Memphis, and Volume 3 to Roanoke.

The first part of your trip to Memphis will not be found a pleasant one, and it

would even be advisable to send your car to Tuscomb, Ala., by freight. We do not mean to say that the roads are impassable between Pine Bluff and Tuscomb, for people have succeeded in making such a trip, but it certainly is not much of a pleasure jaunt to go over them.

Routing to Atlanta the itinerary is Leighton, Town Creek, Courtland, Wheeler, Hillsboro, Trinity, Decatur, Huntsville, New Hope, Guntersville, Brooksville, Oneonta, Village Springs, Birmingham, Gate City, Trussville, St. Claire Springs, Asheville, Anniston, Oxford, Iron City, Heflin, Tallapoosa, Waco, Bremen, Temple, Winston, Douglasville, and Mapleton.

Atlanta to Greenville, S. C., 189 miles, routes over the main highway through Decatur, Ingleside, Scottdale, Clarkson, Stone Mountain, Snellville, Auburn, Winder, Jefferson, Commerce, Pocatigo, Franklin Springs, Royston, Canon, Bowersville, Lavonia, Anderson, Piedmont and Oak Grove. Greenville to Charlotte, N. C., 116 miles, through Greer, Duncan, Spartanburg, Converse, Gaffey, Blacksburg, Grover, Kings Mountain, Bessemer City, Gastonia, Lowell, Belmont, and to Winston-Salem, 135 miles, through Newell, Concord, Kanapolis, Landis, China Grove, Salisbury, Lexington, Thomasville, High Point, Jamestown, Greensboro, Summerfield, Kernersville, and Centerville, and terminating with a 124-mile stretch to Roanoke through Centerville, Kernersville, Stokesboro, Ellsboro, Madison, Stoneville, Ridgeway, Martinsville, Oak Level, Syndorville, and Rocky Mount.

### Hattiesburg, Miss.-Chicago

Hattiesburg, Miss.—Editor Motor Age—I want to make a trip from Hattiesburg to Chicago and would like to know the best route.—H. S. Lillis.

Your route lies to Meridian 90 miles, then through Alabama by way of Livingston, Eutaw, Tuscaloosa, Bessemer, Birmingham, Village Springs, Oneonta, Brooksville, Guntersville, cross river by Deposit ferry and travel 15 miles to New Hope, Huntersville, Meridianville, Fayetteville, Shelbyville, Murfreesboro and Nashville.

A new road through Kentucky will be found in the 1913 Blue Book routing through Clarksville to Paducah, crossing the Ohio by ferry into Illinois to Anna, Murphysboro and St. Louis. The first few miles out of Nashville are macadam, and the rest of the way natural dirt, but better than the Nashville-Louisville pike. There are two or three small fords which will give no serious difficulty except in very high water. The trip should not be attempted in wet weather due to the slippery clay soil which in some cases would make it impossible to get up the steep climb from one or two ferries. Unimproved dirt roads are encountered all the way to St. Louis, some parts are fairly good, but most of it rough.

It is 177 miles from St. Louis to Peoria routing through Collinsville, Marysville, Edwardsville, Staunton, Litchfield, Springfield, Middletown, Delavan, Dillon and Groveland. Between Peoria and Chicago, pass through Chillocothe, Henry, Hollowayville, Peru, Utica, Starved Rock, Ottawa, Newark, Yorkville, Aurora, Naperville, Hinsdale, Chicago. This last stretch is 179 miles.

Due to the present flooded condition of the central states, you should not try to make an early trip.

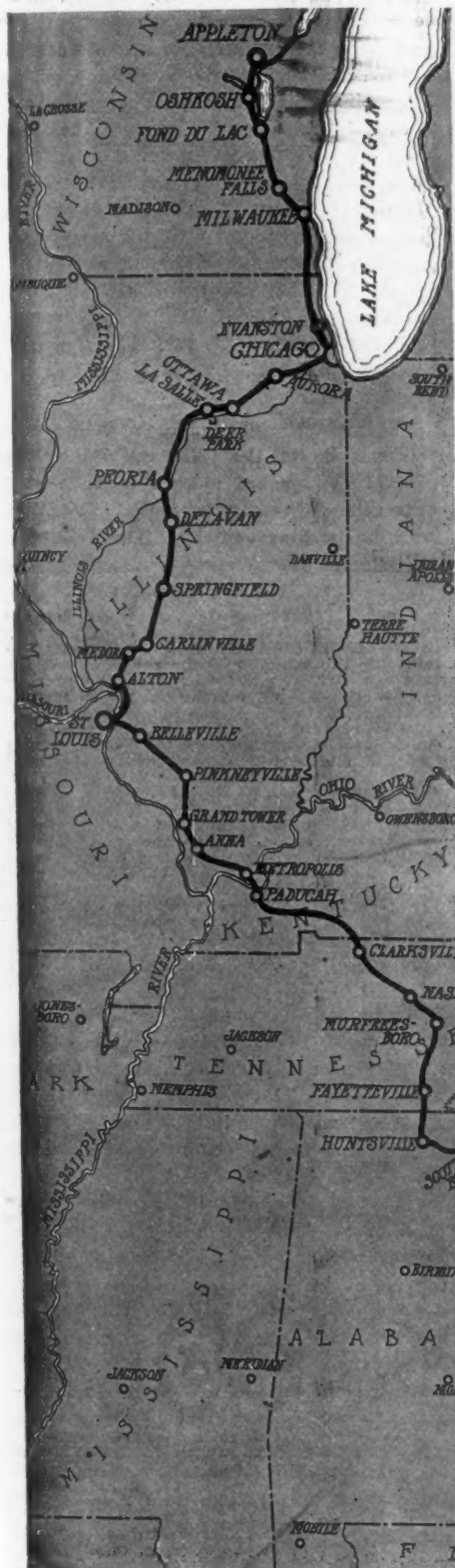
### El Paso, Tex.-Davenport, Ia.

El Paso, Tex.—Editor Motor Age—I expect to tour to Davenport, Ia., about May 1 and would appreciate the best route and distances. I expect to travel in slow stages. Are the roads difficult to follow without a detail guide? My wife and daughter will be with me and I would like to know if the trip will be at all hazardous. Would Motor Age recommend carrying a camping outfit? Will I need to comply with any state laws other than my own?—J. T. Gilroy.

Many people travel without a guide book, but in doing so a lot of good time is lost. Again and again you will come to a fork in the road, and about nine times out of ten you will take the wrong one. For the small sum of \$2.50 this anxiety will be relieved. The 1913 Blue Book, Volume 5, will suffice for the entire trip.

Leaving El Paso over the Borderland route

you will route through Fort Bliss to Alamogordo, a 6-hours' drive; to Roswell through Tularosa, Mesalero, Ruidoso, Hondo and Placho is an 8-hour run; Roswell to Bronco, Tex., Plains and over a toll road through Gomez and Brownfield to Lubbock will take you 8 hours, as will also the run to Amarillo through Abernathy, Hale Center, Plainview, Tulla, Happy and Canyon. A short distance outside of Amarillo the Canadian river is crossed and the routing continued through Dumas, Ruby and Stratford to Texhoma, Okla., in about 6 hours' travel, and the last leg of the Borderland covered in 8 hours, routing through Guymon, Tyrone, Liberal, Kan., Springfield, Plains, Fowler and Reinert to Dodge City, on the Santa Fe trail. The December 5 Motor Age contains an interesting and instructive article on the trip, together with a map.



BEST ROADS BETWEEN APPLETON, WIS., AND WAYCROSS, GA.

Going east to Kansas City on this trail, Dodge City to Hutchinson is 155 miles, and routes through Kinsley, Garfield, Dundee, Great Bend, Ellinwood, Chase, Lyons, Sterling and Nickerson; then to Emporia 122 miles through Halstead, Newton, Peabody, Florence, Clements, Elmdale, Cottonwood Falls and Plymouth. The last stretch is into Kansas City, 134 miles, and passes through Waverly, Williamsburg, Ottawa, Edgerton, Olathe and Martin City.

The Mt. Ayr line is 277 miles long, extending from Kansas City to Des Moines, Ia., through Leavenworth, Lowmont, Atchison, Russell, St. Joseph, Stanberry, Grant City, Mt. Ayr, Tingley, Afton, Macksburg, Winterset and Booneville.

This Des Moines-Davenport leg of 187 miles is the eastern half of the River-to-River road and is an excellent run through Mitchellville, Colfax, Newton, Kellogg, Grinnell, Brooklyn, Victor, Ladora, Marengo, Homestead, Tiffin, Iowa City, West Liberty, Moscow, Wilton, Durant and Wolcott.

You will be able to secure satisfactory hotel accommodations on your entire trip, and it is a matter of choice as to the camping outfit. However, Motor Age is not alone in the opinion that the camping idea presents a more care-free manner of seeing the country. It allows of following your own inclination, makes the necessity of following a time schedule in order to satisfy the inner man a joke, and gives you about two weeks of the most healthy and invigorating vacation a business man could desire. The issue of April 4 illustrated some camping accessories which might be of interest.

Your own home state license will be sufficient for your tour.

#### Cleveland, O.—Elmira, N. Y.

Lewiston, Idaho.—Editor Motor Age—Please advise me the best route from Cleveland, O., to Elmira, N. Y. What are the best places to stop over night, and the distances between these points? Is September a good time to make this trip?—S. Y. Johnson.

You can make the trip from Cleveland to Warren, Pa., the first day. This is a distance of 163 miles and the routing is through Willoughby, Painesville, Unionville, Geneva, Ashtabula, Conneaut, Girard, Erie, Waterford, Union City, Corry, Columbus, Wrightsville, Pittsfield, Irvington, Warren.

The second day is a distance of 171 miles and through Kinzua, Custer City, Bradford, Smethport, Port Allegheny, Coudersport, Brookland, Ansonia, Wellsboro, Hammond, Tloga, Seely Creek, and Elmira. The Carver and New Struthers are the best hotels in Warren.

Volume I, Blue Book, will give you running directions for this as well as any little side trips you may wish to take in that territory. September is an excellent time to tour.

#### Chicago-New York

Chicago—Editor Motor Age—Myself and family are going to make a trip to New York in July and shall use the routing published in the issue of January 30. Will Motor Age suggest a routing for our homeward trip? We thought of visiting Wash-

ington, and come back by way of Philadelphia and Altoona, or some other good scenic route. There will be five of us and we shall use a six-passenger Cadillac. I have had no experience over mountainous roads, and would like to know if there is any special equipment necessary for this kind of driving. We do not expect to do any kind of speeding, as we have 6 or 7 weeks to make the trip.—Subscriber.

A short run of 103 miles will take you to Philadelphia. Take the Weehawken ferry at West Forty-second street and route through Newark, Elizabeth, Rahway, Metuchen, New Brunswick, Kingston, Princeton, Trenton, White Horse, Bordentown, Columbus, Burlington, Bridgeboro, Camden, and the ferry to Philadelphia.

The third day Washington can be made traveling 150 miles through Darby, Village Green, Chelsea, Wilmington, Del., Newark, Elkton, Perryville, Havre de Grace, Churchville, Belair, Towson, Baltimore, Relay, Laurel, and Bladensburg.

Washington to Bedford, Pa., is a journey of 158 miles, made through Bethesda, Rockville, Frederick, Thurmont, Emmitsburg, Gettysburg, McKnightstown, Cashtown, Chambersburg, Ft. Loudon, McConnellsburg, Breezewood, Everett and Mt. Dallas.

Pittsburgh will be found a trip of 100 miles, passing through Schellburg, Buckstown, Kantner, Jenners, Ligonier, Youngstown, Greensburg, Adamsburg, McKeesport, Wilmerding, and Wilkinsburg.

The volume I Blue Book can be used from Washington to Pittsburgh, Pa., for running directions, and for the balance of the trip the number 4 is utilized. The mileage as given in this book from Pittsburgh to Columbus is 190 miles, and the itinerary Carnegie, Canonsburg, Washington, W. Alexander, Wheeling, Bridgeport, Morristown, Elizabethtown, Cambridge, Zanesville, Brownsville, Kirksville, Reynoldsville, and Columbus.

It is 153 miles between Columbus and Ft. Wayne, and the towns are Dublin, Marysville, Zanesville, Bellefontaine, Roundhead, Lima, Delphos, and Van Wert; and Ft. Wayne to Chicago, 163 miles, through Columbia City, Pierceton, Warsaw, Atwood, Bourbon, Plymouth, Donaldson, Hamlet, Hanna, Valparaiso, Merrillville, Schererville, Highlands, Hessville, Grassell, Whiting and South Chicago.

Outside of your chains which you might have to use you will not need anything to assist you in safe travel over the mountains. Every morning and noon look over the car and be sure your brakes and clutch are in perfect working order.

#### Appleton, Wis.—Way Cross, Ga.

Black Creek, Wis.—Editor Motor Age—Kindly publish route and illustration of the best road from Appleton, Wis., to Way Cross, Ga., with distance between the larger towns. Also note any points of special interest that lie on this route. What is the total mileage?—H. J. Brinkman.

You can make Chicago the end of the first day by routing as follows. It is a distance of 193 miles with noon stop at Milwaukee, 103 miles, the itinerary being Appleton, Neenah, Oshkosh, Van Dyne, Fond du Lac, Theresa, St. Lawrence, Scheisserville, Meeker, Menominee Falls, and Milwaukee. Through no towns of importance, but over a fast road it is 95 miles to Chicago through Kilbournville, Deerfield, Grosse Point, Evanston, and Sheridan road to Chicago.

A run of 179 miles will take you to Peoria with a noon stop at Ottawa, going through Forest Park, Hinsdale, Naperville, Aurora, Yorkville, and Newark, then on through Utica, La Salle, Peru, Seatonville, Henry, Chillicothe, and Mossville. Starved Rock and Deer Park should be visited on the way from Ottawa to La Salle.

A 185-mile trip the third day lies to St. Louis, over dirt roads by way of Delavan, Middletown, Springfield, Chatham, Virden, Carlinville, Chesterfield, Medora, Brighton, Alton, Granite City.

Between St. Louis and Nashville, with natural roads still prevailing the towns are Belleville, Coulterville, Pinckneyville, Murphysboro, Jonesboro, Belknap, Metropolis, Paducah, Ky., and Clarksville, Tenn. Because of the terrible condition of the pike road in Kentucky this road is advisable. There are several fords to be crossed, but they are generally low.

The Nashville-Atlantic, Ga., stretch is not so very bad by way of Murfreesboro, Shelbyville, Fayetteville, Meridianville, Huntsville, Gurley, Woodville, Larkinsville, Scottsboro, Fackler, Jasper, Chattanooga, Lafayette, Summerville, Rome, Cartersville, Acworth, Kennesaw, and Marietta. Valdosta is 246 miles distant and the itinerary is Hopeville, Jonesboro, Love Joy, Hampton, Griffin, Orchard Hill, Barnesville, Forsythe, Lorane, Macon, Echecoonnee, Vienna, Sibley, Ashburn, Cycloneta, Tifton, Eldorado, Lenox, Adel, and Hahira.

Way Cross is by way of Homerville from Valdosta.





# The Readers' Clearing House

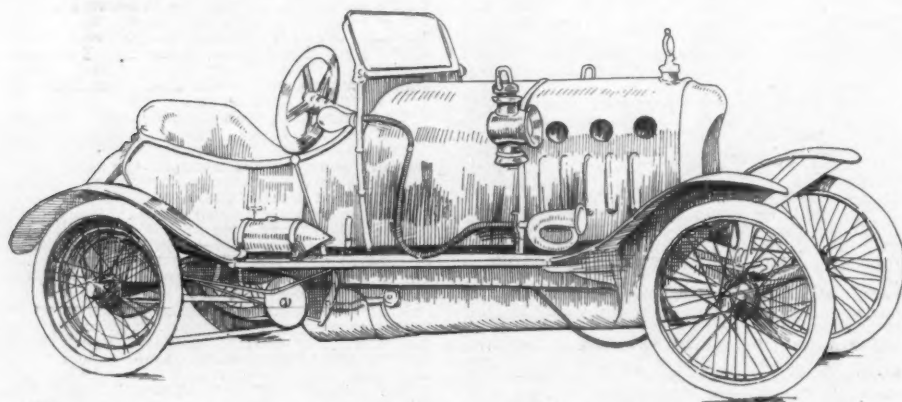
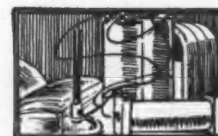


FIG. 1—CYCLECAR DESIGN SHOWING BELT DRIVE

## WANTS DESIGN FOR A CYCLECAR Reader Interested in Small Belt-Driven Power Wagon

BETHPAGE, TENN.—Editor Motor Age—I have noticed from time to time discussion on small cars using motorcycle wheels and driven by belt, or cyclecars, as you call them. I also notice in your last issue of Motor Age you say these can be built almost entirely of standard parts. I have had this in mind for about 2 years and would like to try out a design that I know would be a success.

The wheels and axles are the parts that are worrying me. Where can these parts be obtained and if motorcycle wheels are used how can one get a spindle through the hub large enough to stand the strain? Is there a coaster brake hub made that will work in opposite direction from standard or from right to left? If so, this would make a fine differential.—R. F. H.

A cyclecar can be built of practically standard parts as was stated, and there are many ways of going about it. For American roads the tread of cyclecars probably will not exceed 36 inches on account of the ruts encountered with wider tread unless the full 56-inch standard tread is used. This, of course, would take up too much power for the average motorcycle motor against a head wind. This point was discussed in Motor Age for Feb. 13. With this narrow tread the seating would be tandem fashion probably, and the weight carried very low.

Rather than motorcycle wheels, sidecar wheels would be used, these having a  $\frac{1}{8}$ -inch spindle, though the new cyclecar hubs being brought out by the Eclipse Machine Co., of Elmira, N. Y., are better. Standard motorcycle "V" belts can be used for transmission to rear wheels, with standard pulleys from the Standard Welding Co., Chicago. The motor might be either a Spacke, made in Indianapolis, Ind., or a Mack, made in Milwaukee, Wis., these being the two most prominent which can be bought separate from the motorcycle. Friction drive disks—and this drive is almost ideal with the belt final drive and the small power used—can be obtained from the Rockwood Mfg. Co., Indianapolis, Ind.

For axles the spindles of the sidecar or cyclecar hubs can be brazed into the ends

of a length of steel tube, the front one being fitted to turn at the center or made with steering yokes for regular steering if desired.

With narrow tread, however, it is desirable that the wheels be independent of each other, so that flat cross springs might be used for axles. These have been used abroad with success.

There is no doubt but that the cyclecar is coming and coming fast, the interest aroused in the new vehicle within the last 6 months being astonishing, but the main idea must be to aim for the cheapest design that will do the work and do it all the time, frills being left off.

The idea of using coaster brakes for differential effect might work out but one could make a differential good enough for a cyclecar at much less cost than that of a single coaster brake. Why not use belt drive, which is ideal on a cyclecar—though not on a motorcycle—and be rid of the necessity for a differential, as foreign experience has proved. In Fig. 1 is shown one design of a cycle car. It will be noticed that the radiator is well behind the front axle. The placing of the side lamps midway between radiator and dash adds to the car's odd appearance.

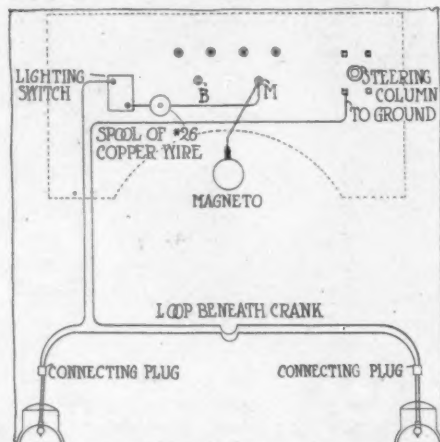


FIG. 2—FORD LIGHTING SYSTEM DESIGNED BY READER

## AN EARLY MOTOR CAR CONTEST

### Provisions of Trials in Boston 15 Years Age Were Novel

Boston, Mass.—Editor Motor Age: Your recent historical story on motors in New England suggests a report of the judges on motor carriages which were exhibited at the triennial exhibition of the Massachusetts Charitable Mechanic Association in this city in 1898. At this exhibit were six makes of vehicles, namely, Pope, Riker, Eaton, Whitney, DeDion, and Haynes-Apperson. At this exhibition the judges were to report on ten features connected with the motor vehicle, namely; 1, speed; 2, manageability; 3, simplicity of construction; 4, durability; 5, appearance; 6, brake efficiency; 7, range of speed; 8, comfort; 9, cost of operation; and 10, grade climbing.

The instructions issued to the judges contained some of the following interesting excerpts which are a good guide to the conception of many people at that time regarding motor vehicles. The following are some extracts.

1—Speed. A greater speed than 15 miles per hour is not needed; for in the case of country roads the condition of the roads usually would prevent a greater speed without injury to the vehicle and the rider; and in the case of city roads faster riding would be against the law on account of the danger to foot passengers.

2—Manageability. The carriage should be easily turned, quickly started, and quickly stopped, and easily guided where the road is small as in a crowd of vehicles, or in a very narrow street.

9—Cost of operation. This is in the case of all the carriages exhibited so very small an item that it would hardly have any influence upon the user of a motor carriage in deciding which to purchase; it is not in any way to be compared to the cost of keeping a horse. The cost is in practically all the cases, less than 2 cents on ordinary roads.

10—Grade Climbing. The carriage should be able to overcome as steep, or even somewhat steeper hills, than horses can climb, and at higher speeds.

On the afternoon of November 9, 1898, there was held under the auspices of the association a series of contests at Charles River park. There were four of these. First, a 2-mile pursuit race from a standing start; second, a brake contest in which two carriages were caused to travel side by side at a speed of 6 miles per hour, and at a given signal from the judges their brakes were applied to determine which could stop in the shortest distance; third, a manageability test in which a number of small vertical stands were arranged in curves, the contesting vehicles passing between the posts, a clearance of 10 inches being allowed between the posts over and above the greatest width of the vehicle, and fifth, a hill climb on an incline 80 feet in length, starting from a level and ending at 36 per cent grade.

The report is too voluminous to go into the various results of the different contests, but the nature of these contests

shows that fifteen years ago many of the people had a relatively clear conception of certain requisites of motor cars, and at the same time had a very inadequate conception of possible speeds, cost of operation, etc.—Henry D. Dupee.

### TIMING OF KNIGHT SLEEVE VALVES

#### Position of Reciprocating Sleeves at Various Piston Stages

Harvey, Ill.—Editor Motor Age—I would like the following information relative to the Knight motor as built by Stearns, Stoddard-Dayton, and Columbia:

- 1—Number of cylinders and horsepower.
- 2—Bore and stroke.
- 3—Timing in degrees of crank rotation as follows: Suction opens, suction full open, suction full open dwell, suction closed, exhaust opens, exhaust full open, exhaust full open dwell, exhaust closed.
- 4—In measuring the effective port areas, is it measured around the circumference of the circle or straight across from side to side to obtain the length—Lee C. Cass.

1 and 2—Motor sizes and S. A. E. ratings of the cars are as follows:

CAR.	No. Cyl.	Bore and Stroke.	S.A.E. H. P.
Stearns .....	4	4.25x5.50	28.9
Stearns .....	6	4.25x5.75	43.8
Stoddard-Day .....	6	4.50x5.50	48.6
Columbia .....	6	4.88x5.13	38.0

3—The timing in degrees of crank rotation on a representative Knight engine is shown in Fig. 3. Confusion may arise over the fact that the last illustration shows the crankshaft in the same position as it is in the second illustration. This must be true. For when the exhaust valve is open fully the intake valve must be closed; otherwise the exhaust gas may go through the intake valve.

4—The port area is measured around the circumference of the sleeve.

#### Has Poor Coast in Rear Axle

Aurora, Ill.—Editor Motor Age—I have a Studebaker-Flanders 20, 1912 model, and would like to overhaul the engine this spring, doing the work myself. Will Motor Age tell me briefly how to go about it?

2—Is there any way of draining the oil

reservoir of this engine without removing the drip pan?

3—Why is it that the gears in the rear axle make such noise, especially when slowing down? Is there any way of remedying this condition?—Subscriber.

1—This cannot be told in the clearing house as it should be told, on account of lack of space, but within a short time an article on car overhauling will appear in Motor Age.

2—There are two holes in the drip pan, through which one may insert his hand. In this way the pet cocks in the two halves of the crankcase may be opened and the oil allowed to flow out.

3—The condition is called a bad coast. That is, when the car is coasting the gears grind. Usually the trouble is with the differential gears not being in mesh properly. They may be worn badly and require readjustment. However, the noise may be coming from the gearset and you imagine it to come from the differential. Adjusting the differential gears on a Flanders 20 is not an easy matter and the job should be given to the factory.

#### Questions Answered—Communications

R. F. H. ....	Bethpage, Tenn.
Henry D. Dupee. ....	Boston, Mass.
Subscriber. ....	Aurora, Ill.
Lee C. Cass. ....	Harvey, Ill.
C. R. Welsh. ....	Clay Center, Kan.
George G. Joyce. ....	Chicago
Roy E. Steele. ....	Kansas City, Mo.
A Reader. ....	Denison, Ia.
A Reader. ....	Guthrie Center, Ia.
A Friend. ....	Detroit, Mich.
James Michaelian. ....	Fresno, Cal.
J. E. Clark. ....	Fort Worth, Texas
R. C. Johnson. ....	Chicago
F. W. Finlayson. ....	Belvedere, Cal.
Ted Campbell. ....	Virden, Ill.
David Dean. ....	Avalon, Wis.
Municipal. ....	Marshalltown, La.
Charles W. Bowman. ....	Tours, France

### PREVENTS FORD LIGHTING TROUBLE

#### Kansan Suggests Ingenious Remedy for Lamp Bulbs Burning Out

Clay Center, Kan.—Editor Motor Age—It is a common complaint for Ford electric headlights to be burning out too soon on some cars, while others are not bothered that way. I have tried inserting resistance in the circuit on a number of the cars that burned out their lights and have never heard any more from them.

The main feature of this system is the spool of wire shown to the right of the lighting switch, Fig. 2. Frequent burning out of lamp bulbs can be stopped by inserting in the circuit a spool of rather fine wire to increase the resistance of the circuit. The amount of wire depends altogether on the strength of the magneto.

The spool can be an embroidery-silk spool shellacked and wound with about 25 feet of insulated No. 26 copper wire. This spool then can be screwed to the dash in some out-of-the-way place and one end of the wire fastened to the lighting switch. The other end then should be twisted to a strong wire running to the magneto binding post and the engine started and the lights turned on. If the lights burn too dim take out a few feet of the wire and try again until they do not burn too bright when the engine is running at about the speed the driver ordinarily runs at night.—C. R. Welsh.

#### Piston Displacement Calculation

Chicago—Editor Motor Age—What is the formula for determining piston displacement on foreign cars?—George G. Joyce.

It is the same as the American formula, as it is a mathematically exact quantity.

$D^2SN .7854$  = piston displacement, where

$D$  = bore in inches.

$S$  = stroke in inches.

$N$  = number of cylinders.

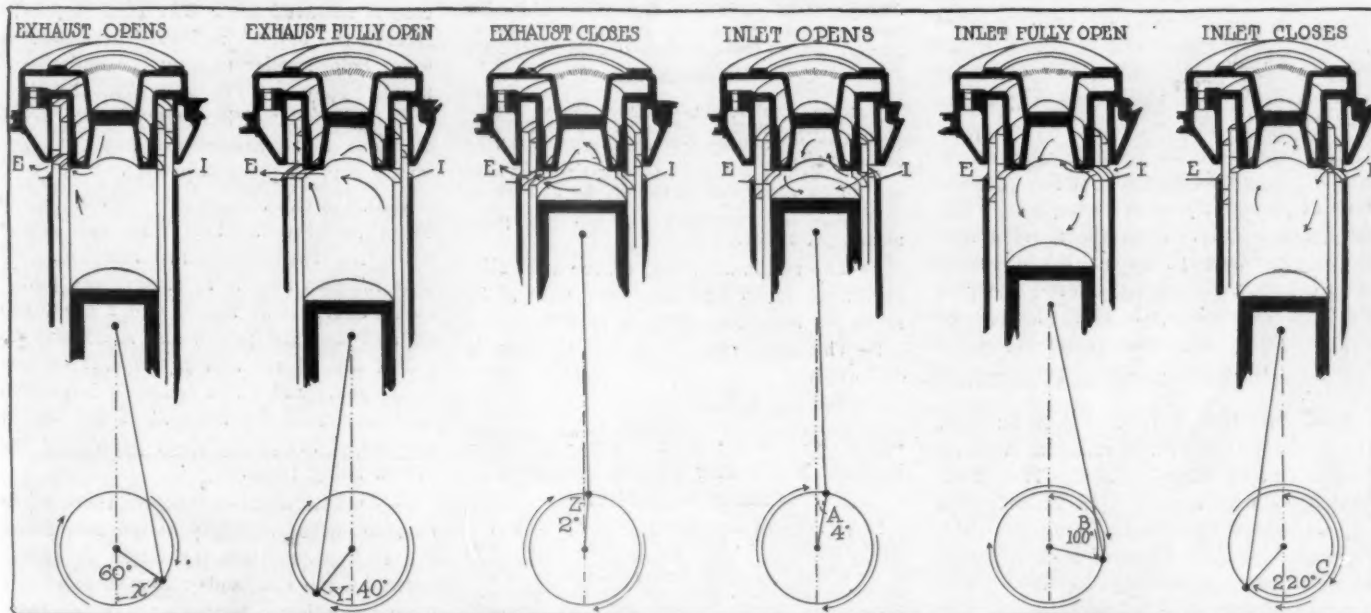


FIG. 3—VALVE TIMING OF KNIGHT ENGINE; STARTING WITH THE ILLUSTRATION AT EXTREME LEFT

Here the exhaust valve begins to open when the crankshaft has reached a point 60 degrees before bottom dead center. The next illustration shows the exhaust valve fully open at 40 degrees past bottom dead center. The exhaust valve closes at a point 2 degrees before top dead center, as shown in the next illustration. The inlet valve opens when the crankshaft has reached a point 4 degrees past top dead center. The sixth illustration shows the inlet valve fully open at 100 degrees past top dead center and the last illustration, the inlet valve, is closed at 220 degrees past top dead center, or 40 degrees past bottom dead center.



## WANTS GEAR RATIOS MADE LOWER

Racing Car Information—Pope Mfg. Co.  
Still in Business

Kansas City, Mo.—Editor Motor Age—What is the name and address of the St. Louis concern which makes a gas engine piston ring known as the Non-Leak?

2—Four-cylinder, 50-horsepower touring cars are commonly geared 3 to 1 in high. I notice that six-cylinder cars of the same power are geared 3 to 1, or  $3\frac{1}{2}$  to 1. Now, a six is supposed to be more like a steam engine in its steady application of impulses; accordingly, why do not manufacturers gear a six  $2\frac{1}{2}$  to 1, or at least gear it higher than four of the same power?

3—Has the Chadwick in the past participated in any races of importance and if so in what issues of Motor Age may I find some of its records?

4—What has become of the White Flyer and Whistling Billy?

5—How did the 6-70 Thomas Flyer score in the 1910 Glidden tour?

6—Did the Pope Mfg. Co., makers of the Pope-Toledo, fail or simply quit the business?

7—Answer the same in regard to the makers of the Royal Tourist.—Roy E. Steele.

1—Leak-Proof rings are manufactured by the McQuay-Norris Mfg. Co., 1312 Chestnut St., St. Louis, Mo.

2—Continuity of power torque has little to do with the gear ratio. The gear ratio is determined by the power of the engine, the weight of the car, the type of roads over which it is expected to travel, and speed at which the car is supposed to travel. If a four-cylinder car of 50 horsepower, installed in a 3,500-pound car has a 3 to 1 gear-ratio, a six-cylinder car, of the same power, and same weight, if it is to be used under the same conditions, should have the same gear ratio.

This rule applies likewise to steam motor cars, with this difference. It would be possible to install a steam engine in a motor car with a 1 to 1 gear, but this would require that the steam be carried approximately at three times the pressure necessary under similar conditions where the gear reduced to a ratio of 3 to 1. This pressure, while it would involve no more consumption of fuel than a lower pressure, at a higher engine speed, would require a boiler and engine of three times the strength, and therefore weight and cost is trebled.

This would not be possible with an internal combustion motor, as it can generate its full power only at certain speeds. The six-cylinder differs from the four in that it will produce power at lower speeds than the four, although the speed at which its greatest efficiency is reached, must be approximately the same, assuming other features of design and operation as similar.

3—Willie Haupt in a Chadwick won the Giant's Despair hill climb at Wilkes-Barre, Pa., on May 30, 1908. The Chadwick also won the City of Philadelphia cup and the 601-750 class, October 8, 1910. It came in second in the Ferris cup race at Los Angeles on July 10, 1909. The account of the Giant's Despair climb was published in Motor Age of May 30th, 1908. The account of the Fairmount Park races will be found in Motor Age of October 13, 1910.

4—Motor Age knows nothing of the

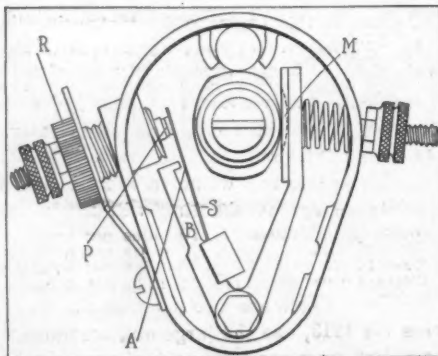


FIG. 4—BREAKER-BOX OF REMY MODEL L MAGNETO

White Flyer. Whistling Billy was Webb Jay's old car, and is now in California.

5—The Thomas was not entered in the Glidden tour of 1910.

6—The Pope Motor Car Co. failed. The Pope Mfg. Co., maker of the Pope-Hartford, never made Pope-Toledos, and is still in business.

7—The Royal Motor Car Co. failed.

## DIMENSIONS OF NEW MAXWELL SIX Bore, Stroke and Cylinder Shape of the 1913 Product

Denison, Ia.—Editor Motor Age—What advantage is gained by using a ram's horn intake manifold, like that used on the 1913 Case 40?

2—What is the horsepower rating of the 1913 Maxwell 6-50 on brake test?

3—What is the bore and stroke?

4—Does this car use a T-head motor?—A Reader.

1—It is designed to give a better mixture. The vapor and air in threading the circuitous passage, strikes the sides of the manifold and is broken up so that the particles mix thoroughly.

2—38.9 at 1,000 revolutions per minute.

3—4 by  $4\frac{1}{4}$  inches.

4—No, L-head.

## MAXIMUM SPEEDS OF KISSELKARS

Iowan Wants Gear Ratios—Buda Motor On  
Michigan Car

Guthrie Center, Ia.—Editor Motor Age—What is the maximum speed of the 1912 model Kisselkar 40; and also of the 1913 model Kisselkar 6-60?

2—What is the gear ratio of the 1913 Kisselkar 30 on high, and of the 40, 50 and 60 on high speed?

3—Does the Michigan car use the Buda motor?—A Reader.

1—The maximum speed of the 1912 Kisselkar 40 is 55 and the 1913 6-60 is 72 miles per hour, according to factory.

2—The gear ratio on all Kisselkars is 3.75 to 1.

3—Yes.

## LEFT CONTROL WITH LEFT STEER Packard Not Center Control As Stated in Answer to Inquirer

Detroit, Mich.—Editor Motor Age—In the issue of March 6, in reply to Geo. B. Slocum, Motor Age states that the Packard uses center control and left steer. As an employee in the Packard factory, I wish to say that you are mistaken. The model Packard 1338 uses left control and left steer. The new 1448 will be built with the same arrangement.—A Friend.

You are correct in your statements. Motor Age made a mistake in saying that the 1913 Packard had left steer and center control. The control is left.

## TAKING DRIVE PINION FROM AXLE

French Motor Papers—Meaning of Anti-Friction Bearing

Fresno, Cal.—Editor Motor Age—Does Motor Age know of any French motor car magazine published on lines similar to Motor Age?

2—Do the burnt gases of the Franklin motor come out of the auxiliary exhaust on the downward stroke of the explosion or when the piston comes up after the explosion.

3—Which is the easiest way to take the pinion gear out of a Timken axle, the axle used on a Reo, Maxwell, Overland and American?

4—What is meant by anti-friction bearings.—James Michaelian.

1—Some French motor car magazines are: Omnia, at 20 rue Duret, Paris; L'Automobile, at 19 rue des Saint-Peres, Paris; and La Revue de L'Automobile, 29 bis rue Demours, Paris.

2—The auxiliary exhaust valve that formerly was fitted to the Franklin motor was placed at the bottom of the piston stroke. It consisted of a valve pocket that was uncovered by the piston on its downstroke. As it was only open when the piston was at the bottom of the stroke, it had no action at other times. Its function was to take off most of the gas above atmospheric pressure, so that the amount forced out of the valve in the head by the piston practically was only that at atmospheric pressure. A poppet valve was placed in the valve pocket at the bottom of the stroke, to keep the cylinder closed during the suction stroke.

3—You mention four makes of cars supposedly using Timken axles. However, you are mistaken when you say that the American does or ever did use Timken axles. The Reo, Overland and Maxwell used Timken axles in 1911 and since have discontinued. The easiest way to remove the pinion from a Timken is to follow these instructions:

In Fig. 5 is shown a popular type of Timken axle. The cover of the differential case is removed first. The next step is to remove the bolts A and B. There are two other bolts similar to A and B underneath these. They are not shown in the illustration, but should be removed also. When all four bolts are removed the clamps which hold in place slip out easily.

With the two clamps out, the differential M is taken out. This falls out almost when the two clamps are removed. All that remains now is to remove the pinion on its shaft. The nuts 1 and 2 are taken off and then the pinion and shaft may be pulled out. A nut and key hold the pinion to the shaft and a few minutes' inspection will show that the removal of the nut at the end of the pinion shaft permits of the pinion being removed.

4—Anti-friction bearings are those which operate on the rolling principle instead of the sliding principle. Friction is engendered by the rubbing of two surfaces one upon the other. A ball or a roller theoretically is free from friction, as there is no rubbing in a perfect rolling movement of surfaces one on the other. Therefore the term anti-friction has been applied to ball and roller bearings.

**MAGNETO TROUBLE ON A JACKSON****Poor Adjustment of Breaker Points Makes the Motor Stop**

Fort Worth, Tex.—Editor Motor Age—I have a Jackson model 32 equipped with a Remy magneto and a Schebler model D carburetor. I have ground the valves, changed the coil and carburetor, dissembled and examined the magneto thoroughly, replaced the breaker points and adjusted them in every way, put on new spark plugs, and have remagnetized the magnets on the magneto; also put on new wire and examined all terminals to see that there were no shorts around the breaker box or elsewhere. Now, why can I not retard or advance the spark? In one position the motor will run nicely, but to change it up or down the motor will stop as if the switch had been turned off. It will run all right on the batteries, advanced or retarded, and hits regularly.—J. E. Clarke.

Your trouble is a common one, and the fault lies in the breaker, particularly in the adjustment of the platinum points. Fig. 4 shows a diagram of the Remy breaker mechanism, as applied to model L. With the cam in the position shown, there should be 1-32-inch clearance at A, between the short breaker arm and the flat spring. To adjust the gap, press in the phosphor-bronze spring and turn the hard rubber adjusting screw R to the right or clockwise.

The reason for the lack of spark in advanced position is that owing to the platinum point P being worn, the breaker arm B breaks its contact with the spring S too soon, so that no current is generated. If, after adjusting the platinum points properly, it is found that the action is no better, the cam must be worn, or its bearing on the arm at M has been worn to the shape shown by the dotted lines. Either of the latter conditions require replacement of the part affected. The fact that the car runs properly on the battery proves that the fault is not with the distributor.

**ORIGIN AND POWERS OF THREE A'S Association Sanctions Race Meets—Gear Ratios of Racers**

Chicago, Ill.—Editor Motor Age—Will Motor Age please inform me as to the origin of the A. A. A., by what authority it can, and by what means it does, enforce the suspension of racing drivers?

2—What high gear ratios are used on the following cars: De Palma's Mercedes, Mulford's Knox and Hugh's Mercer?—R. C. Johnson.

1—The American Automobile Association is a national organization and is the recognized authority in racing matters. A suspension of a driver by the A. A. A. means that he cannot compete in meets sanctioned by it. It, however, has no control over drivers who take part in unsanctioned meets; it simply says they cannot race in events the promoters of which recognize the authority of the A. A. A.

2—Mercer, 2.5 to 1; Mercedes, 1.88 to 1; Knox, 1.95 to 1.

**SPEED OF FOUR MOTOR CARS HIGH****Californian Wants Data Concerning Some Racing Cars**

Belvedere, Cal.—Editor Motor Age—About 5 years ago a Garford car was entered in the Santa Monica race; what showing did it make and against what cars did it race?

2—What is the fastest getaway of an American stock car? What is the getaway of the 300-horsepower Christie car?

3—What are the speeds of the Oldsmobile

Limited, the Garford Six, the Peerless 60 and the Pierce-Arrow 66?

4—Has the Garford company announced its 1913 cars? Are there any changes in its six-cylinder car?—F. W. Finlayson.

1—The Santa Monica race was not run as much as 5 years ago, and no Garford has run in this race.

2—There are no official records on this.

3—These speeds are as follows:

Oldsmobile Limited.....	70 miles per hour
Garford Six .....	70 miles per hour
Peerless 60 .....	75 miles per hour
Pierce-Arrow 66 .....	65 miles per hour

4—Yes. There are two six-cylinder Garfords for 1913, one the large six, continued from last year, and the other, the small six, a new model. The fours have been dropped. Model 14, the large six, is identical with last year's offering in all respects except the substitution of dual ignition for the double system formerly used. The new model, called G-15, was described in Motor Age in the issue of March 6, 1913.

**SPEED OF TWO HUPMOBILE MODELS Edwards-Knight Most Inexpensive Sliding Sleeve-Valve Car**

Virden, Ill.—Editor Motor Age—What is the gear ratio of the 20 horsepower Hupmobile runabout, the 32 roadster and touring car?

2—What speed should the 20 Hupmobile make, also the 32?

3—What are the advantages of a T-head motor over other types of motors?

4—What is the lowest price car using the sleeve-valve type of motor?—Ted Campbell.

1—The gear ratio of the Hupmobile 20 is 4.5 to 1 on high speed, and that of the Hupmobile 32 is 3.86 to 1 on high speed.

2—40 miles per hour for the 20, 50 miles for the 32.

3—The T-head motor possesses the advantages over other types of motors of larger valves than are possible otherwise.

4—The Edwards-Knight.

**HORSEPOWER FOR MOTOR BOB GIVEN Wants Model With Description of Little Homemade Cyclecar**

Avalon, Wis.—Editor Motor Age—1—What is the best horsepower for a motor bob?

2—Please show a good model and give description.—David Dean.

1—It may be said with safety that 7 horsepower is well suited for a motor bob.

2—This was given in the Readers' Clearing House in Motor Age issue of October 24, 1912.

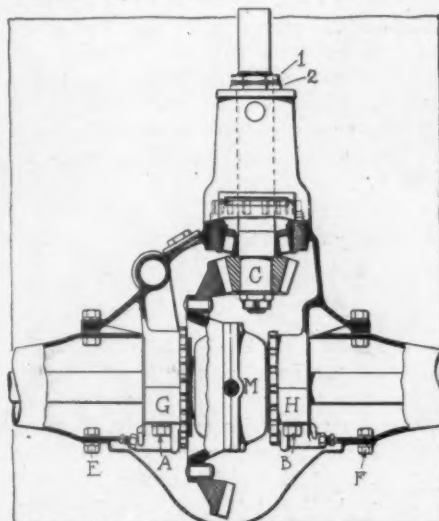


FIG. 5—TIMKEN-DETROIT REAR AXLE

**FIRE APPARATUS DRIVEN BY MOTOR****Differences Between Motorized Fire Equipment and Other Vehicles**

Marshalltown, Ia.—Editor Motor Age—Does the American La France Engine Co., of Elmira, N. Y., and The Seagrave Co., of Columbus, O., build the chassis used in their fire trucks?

2—Do these concerns use a chassis formerly built by some one else. If so, who were the former builders?

3—Is there any material difference between the ordinary fire truck chassis and the chassis of a commercial truck other than the gear ratio?

4—How long has the motor-driven fire truck been in use in the United States and about how many are in use at the present time?—Municipal.

1—Yes.

2—Certain parts of the Seagrave truck were originally former Frayer-Miller products.

3—As a rule fire truck chassis are specially designed to carry heavy loads at great speed. They partake of pleasure car characteristics, in general balance and speed ability, but of commercial design in their weight, carrying capacity and general ruggedness of structure.

4—As near as is known, the first motor fire truck was used in Springfield, Mass., in the nineties. On January 1st, 1912, there were 594 fire cars in use. Although no accurate figures of later date are available, there are probably about 650 now in use.

**DOES CASING CARRY ANY WEIGHT? Reader in France Told That Type of Axle Is Considered**

Tours, France—Editor Motor Age—What, if any, strain comes on the casing which carries the large gear wheel and the three or four small pinions of the differential?

2—Would a Pierce-Arrow cone clutch have a tendency to strain and possibly break the rear axle; or would the most severe strain in starting fall first on the change-speed-gears?—Charles W. Bowman.

1—If the rear axle is of the floating type then practically all the weight over the rear wheels is carried by the casting. If the axle is of the semi-floating type then some of the weight over the rear wheels is carried by the axle and some by the housing. If of the three-quarters floating type, side stress is borne by the rear axle to some extent but nearly all the dead weight is carried by the housing.

2—The stress being first applied to the change-speed gears they will first be strained and the shock transmitted to the rear axle. However, one cannot tell which part would break unless the condition of the gears were known.

**SIXTH CITY CITES THE CENSUS Cleveland Boosters Call Attention to Hasty Statement**

In the Clearing House columns the statement recently was made in a comparison of Indianapolis and Detroit, as motoring centers, with other cities of the country, that Cleveland had never been noted as a manufacturing city. This somewhat unfortunate expression has been pointed out as an error, as Cleveland is admitted the sixth city in the United States. However, in the manufacture of motor cars, it must take third with Detroit and Indianapolis.



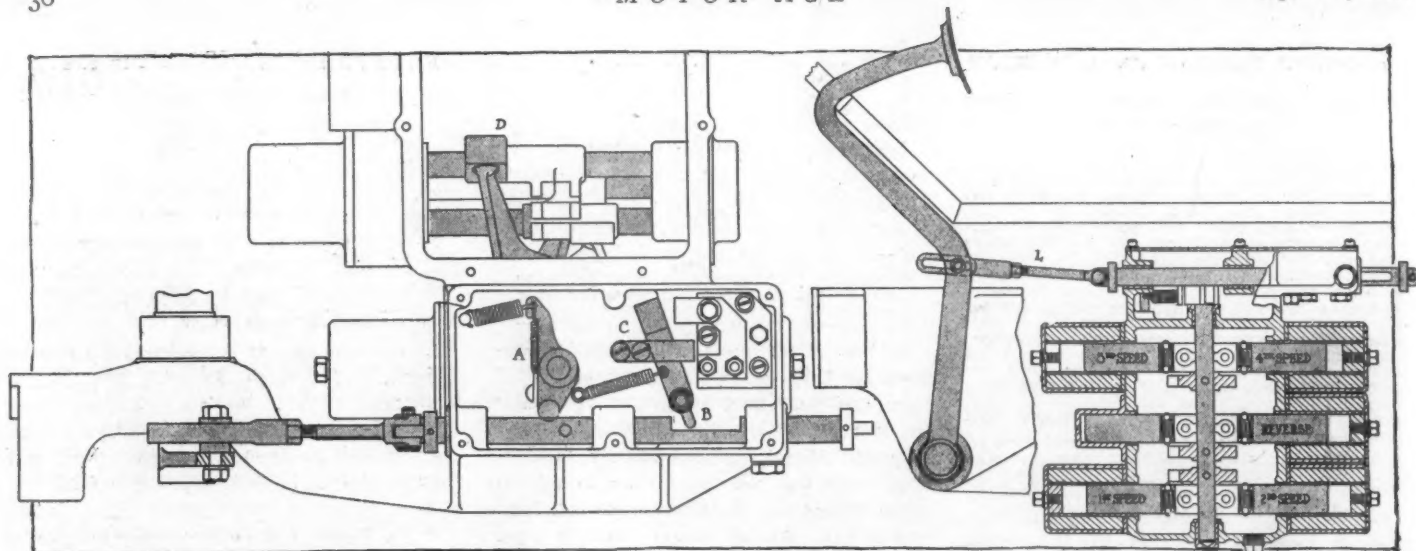


FIG. 1—VIEW OF VULCAN ELECTRIC GEARSHIFT FROM ABOVE  
A, neutral camshaft lever; B, pedal and switch shaft; C, knife-blade switch;  
D, gearshifter arm

FIG. 3—INTERIOR OF ELECTRIC GEARSHIFT  
Showing the solenoid magnets which operate the gears  
and the slotted clutch link L

## Vulcan Electric Gearshift on S. G. V.

### Device Makes Gear Changes by Buttons

**E**LECTRIFICATION of the gasoline car has proceeded another step forward in the adoption of the Vulcan electric gearshift by the maker of the S. G. V. car. When the scope of electricity on cars was confined to the ignition, electric lighting was hailed as a luxury; but with the coming of electric cranking, the next logical step seemed to be some means of operating the gear changes electrically.

This is realized in the Vulcan electric gearshift which has been adopted as stock equipment on all S. G. V. cars. In these cars it is operated in connection with the U. S. L. electric lighting and cranking system and reduces the operation of gearshifting to pushing a button and releasing the clutch.

#### Gears Shifted Quickly

It requires half the usual time to shift gears with the Vulcan control. A system of buttons on the steering wheel and a slightly added length of clutch pedal throw compose the system as far as the driver of the car is concerned. It is merely necessary to touch a button corresponding to the speed at which it is desired to travel, press down the clutch pedal and let it back and the shift is made.

An idea of the appearance of the steering wheel with the device attached is given in Fig. 2. The buttons are numbered corresponding to the speeds which they control. Also there is one marked N and another R, for neutral and reverse.

If No. 4 button is pushed down, the clutch thrown out and then re-engaged, the car will be in fourth speed. If the driver is traveling through traffic on third speed he can set the second speed button and be ready at any moment by a simple motion of the clutch pedal to be in second speed. Or conversely, when traveling through traffic on second, and having

No. 3 button pressed down, a shift to third may be made instantaneously and without lifting the hands from the steering wheel.

It is impossible to strip the gears with this system because the clutch must be fully disengaged before the gears begin to move. The gears are always in neutral before the shift is made. This is accomplished by a positive mechanical action which is a part of the pedal motion in disengaging the clutch.

No two speeds can be engaged at once because each speed is governed independently of any other and an interlocking device provides that no two buttons can be down at the same time. If No. 2 button is set and the driver changes his mind and decides that his next shift will be into fourth, he merely presses No. 4 button and the second speed button returns to its normal position.

The secret of this control is a system of solenoid coils. There are five of these coils, one for each forward speed and one for reverse. Two switches are placed in the line between the battery and the solenoids, first, a knife switch which is controlled by the clutch pedal and second, the push button switch operated from the steering wheel. The knife switch controls all the changes, while the push button switch only controls the particular solenoid belonging to the speed to be engaged.

#### Clutch Pedal Arrangements

A study of the clutch pedal arrangement shown in Fig. 3 will disclose the fact that the pedal moves through a link L for the first part of its motion and during the rest of its movement picks up the link and pulls it along with it. The first part of the pedal throw has only to do with the clutch. The clutch may be slipped in ordinary driving in the

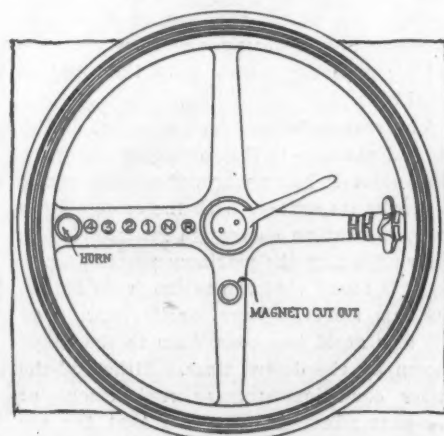


FIG. 2—GEARSET CONTROL BUTTONS  
Pressure on the button corresponding to the speed desired makes the change when clutch is released

usual manner. The movement after the clutch has picked up the link operates the knife switch sending the current through the solenoid coil and pulling a plunger against a magnet with a force of 150 pounds.

#### How It Works

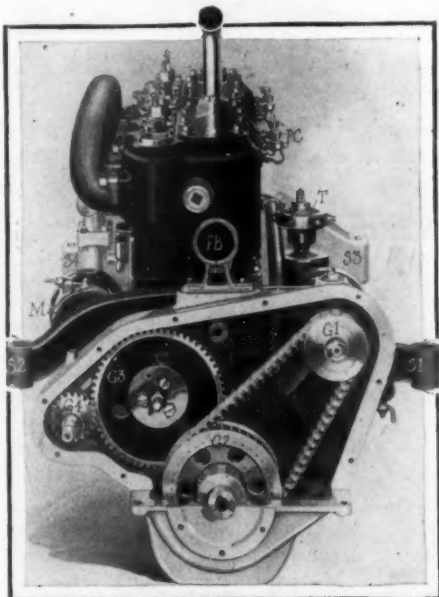
In the sectional elevation given in Fig. 3, the solenoid coils are seen. These are labeled first, second, third, fourth and reverse speeds in the drawing. The plungers are shown in neutral position. When the button is pressed and the knife switch thrown in a 12-volt current is passed through the coils surrounding the plungers and they are drawn against the magnets. The pull of 150 pounds is enough to shift the gears instantaneously and without any sign of clash. Since the gears cannot be shifted until the pedal has traversed sufficient distance to fully disengage the clutch, there is no danger of stripping the gears through meshing while the clutch is still engaged.

The box containing the switches and solenoid coils is mounted on the side of the gearbox. An idea of the method of arrangement may be seen in Fig. 1. The

left view in this illustration is a diagram looking down on the shifter mechanism. The pedal and switch shaft B may be seen along with the knife blade switch C and the neutral camshaft lever A. The function of the camshaft which extends across the control box between the solenoids, Fig. 3, is to pull the gears back to neutral between shifts.

#### Little Current Required

The current required to make the shift is 17 amperes, and the S. G. V. company figures that 300 shifts can be made with less current than it takes to start the car once and that the added weight to the car is but 46 pounds when the entire electric control system is considered. This includes lighting and starting. The buttons on the steering wheel are arranged on the demonstrator model on a circular box in the steering wheel instead of in the steering wheel spider as shown in Fig. 2. The device is the design of S. S. Eveland of Philadelphia, Pa.



FRONT OF CONTINENTAL SIX  
Silent chain from sprockets G1 to G2 for electric cranker

## New Continental Little Six Motor

### Small Engine Has Provision for Starting

THAT makers of motors are in touch with the trend of demand among owners of cars is evidenced in the latest product of the Continental Motor Mfg. Co. This is a six-cylinder engine of small size. The production of a little six is in itself a deference to the growing popularity of that type of power plant.

In the details of design the motor shows a commendable regard for the recent developments in car equipment. For instance, the crankcase is designed to accommodate any form of engine cranker, or electric lighting dynamo and a silent-chain drive for cranking purposes is incorporated in the timing gearcase. Timing gears are cut helically for the sake of silence, which is further obtained by the inclosure of the valves.

The motor is marketed either independently or as a part of a unit power plant, with a three or four-speed gearset, which in turn is adapted to be controlled from either side or the center.

#### Details of Motor

The new motor has a bore of  $3\frac{3}{4}$  inches and a stroke of  $5\frac{1}{4}$  inches, rated at 33.75 horsepower at 1,150 revolutions per minute, according to the S. A. E. formula. Cylinders are of the L-head type, cast in blocks of three. This economizes length in the motor, with the result that the engine will go under a 40-inch hood without crowding. The total weight of the motor with flywheel and the regular equipment is 600 pounds.

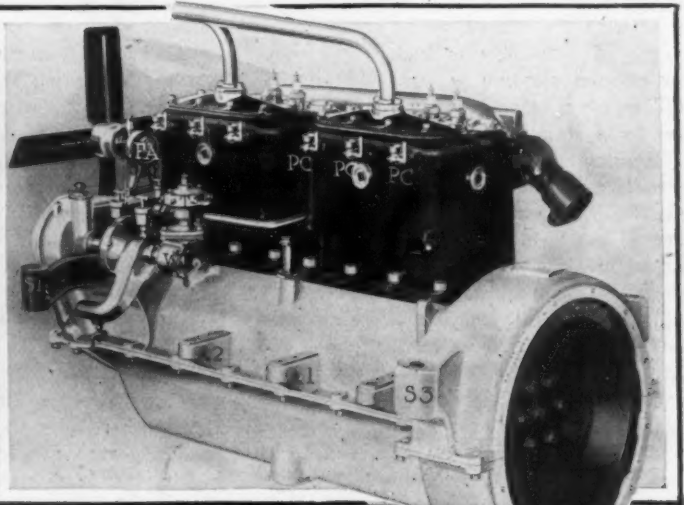
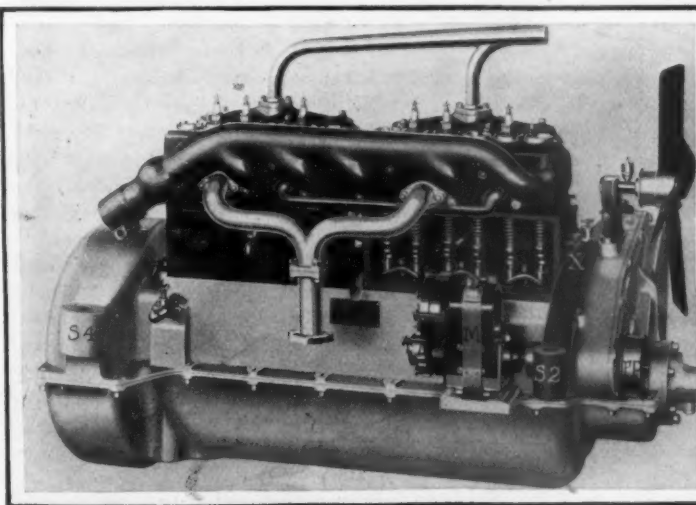
To avoid twisting strains on the crankcase the motor is suspended upon three points. The two rear points of support S3 and S4 are cast integral with the flywheel housing, while the forward support is a pivot X hung on a transverse bar supported on the frame at S1 and S2. The pivot support on the front of the

motor is supplied with a bronze bushing and equipped with an oiler to prevent noise and wear. A gas passage cored inside each cylinder block allows the use of a simple Y-shaped intake manifold.

#### Valve Inclosure Provided

Valve inclosure is provided by two metal covers each held in place by a wing nut. Valve tappets and stems practically operate in oil. Lubrication of the motor is a combination pressure feed and splash system with a constant level. The oil is circulated by means of a gear pump, which forces it directly to the three main bearings, whence it is returned to the reservoir in the lower part of the crankcase. The overflow from the front main bearings falls into a pocket in the timing gearcase in which the large sprocket G2 on the crankshaft and the silent chain are partly submerged. This carries oil up to the timing gears and lubricates all the bearings on the front end of the Continental motor.

The silent chain runs in a bath of oil and drives the water pump and commutator shaft and possibly an electric generator when not doing duty in the cranking system. Water circulation is cared for by a centrifugal pump which forces cool water directly under the valves to the hottest points. Attention has been given to the question of accessibility. The cams, for instance, are integral with the camshaft and when the timing gearcase cover is removed the camshaft may be withdrawn. An unusual detail is to be noticed in the location of the priming cups PC on the side of the motor away from the valves. The fan is driven by flat belt from the fan pulley FP and the fan belt adjustment consists of an eccentric bushing surrounding the fan bearing and located in the fan bracket FB.



RIGHT AND LEFT SIDES OF NEW CONTINENTAL LITTLE SIX MOTOR  
Showing location of magneto M and the front point of support X. Right-hand view shows A1, A2 and A3, the lugs for attachment of electric generator and cranking motor



# French Try Motor Tractors



Upper left-hand corner—Trucks assembled for artillery tests. Upper right-hand corner—Tested in hauling through soft sand. Lower left-hand corner—Demonstration of hill-climbing ability

## Power Vehicles Prove Worth to Army

**H**ORSES have been marked for abolition from the artillery service of the French army. The French, who claim to have the finest artillery in the world, have come to the conclusion that better service can be obtained on the field with motor tractors than with teams of horses. Higher speed and greater mobility is assured with the use of motor vehicles, the degree of reliability is higher, the number of men per gun is less, and all possibility of a battery being rendered useless by a stampede of horses is avoided.

Experiments have been carried out for a considerable length of time and such satisfactory results have been obtained that it has been decided to make use of motors in place of horses for all the regiments stationed in Africa. For the time being mechanical traction is being used for the heavy 220-millimeter guns, the lighter arms still being served by horses.

Orders have been placed with manufacturers for special types of four-wheel drive motor tractors and some of these were put through their paces last month in the military grounds at Vincennes, to the east of Paris. The vehicles were supplied by Panhard & Levassor and Balachowsky & Caire. The program called for an

ability to haul a load of 12 tons over any kind of ground on which horses could operate. The tractors took in tow a line of gun carriages and ammunition wagons, the first carriage bearing the 220-millimeter gun, and was called upon to haul it over every kind of ground on which horses had successfully ventured.

The most severe tests consisted in taking the load of 12 tons up very steep banks of soft earth forming the background to the artillery firing ranges. The earth was either so soft or so muddy that there was very little traction for the wheels, yet all these tests were successfully accomplished. In the mud-plugging competition the machines had to go through mud reaching to the hub caps. Another test was the ability to get over the trunk of a big tree which had been laid across the track and pinned in position to prevent it being pushed out of the way by the wheels. This also was done successfully. Finally there was an immersion test, the Panhard tractor being taken down the muddy river bank under its own power and run into the stream until its wheels were entirely under water, the frame members just being submerged. After remaining in this position for a little while, the ma-

chine was brought out under its own power.

The Panhard & Levassor tractor is a six-cylinder machine with its motor under a bonnet and a platform body carried behind the driver's seat. The cylinders are cast separately but are bolted together so as to form a common water-jacket. There is shaft drive to all four wheels, and in addition the tractor has a winding drum placed beneath and across the front of the frame. The tractor is equipped with twin rubber tires both front and rear.

### TRUCKS AID IN RELIEF WORK

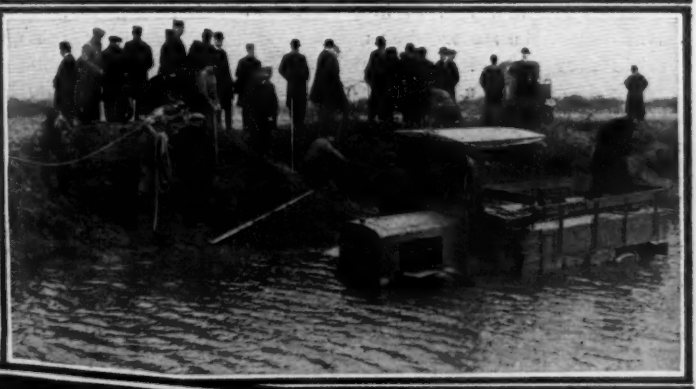
It is impossible to estimate the value of motor trucks in the relief and rescue work at Dayton. It is estimated that nearly 500 horses were drowned in the flood and, of course, it was necessary to replace these horses immediately in order to proceed with the rescue and relief work.

John H. Patterson, of the National Cash Register Co., sent out a call for motor trucks and, as Springfield is the nearest city of any size to Dayton, Kelly trucks were the first to respond to this call. They carried capacity loads of food and clothing from Springfield. After arriving at Dayton they did all sorts of work, and were especially valuable in distributing food and supplies from the central station at the National Cash Register Co. to the relief stations in the outlying portions of Dayton. They were also of considerable value in carrying away the debris left by the flood and also carrying rescued persons to places of safety.

# in Artillery Service



Upper left-hand corner—Tractors show ability getting over tree trunks. Upper right-hand corner—The immersion test. Lower right-hand corner—Hauling line of gun carriages and ammunition wagons



**M**ORE than 250,000 tons of freight are hauled through the streets of Chicago every day, a tonnage approaching 100,000,000 a year, this local movement of goods rivaling the business of a transcontinental railway and representing a business of more than \$60,000,000 and an investment of over \$85,000,000. Such are the total figures furnished in the report of the Chicago Association of Commerce on the teaming and express business of Chicago, just issued.

More than 10,000,000 tons of coal are trucked through Chicago's streets annually, continues the report, while structural steel, brick, sand, ice, general merchandise, produce, packing house products and milk are mentioned as the chief items of hauling following.

Twenty-thousand vehicles of every description have been counted in a single day between 4 a. m. and 6 p. m. on South Water street—the commission row of Chicago.

Two million passengers daily enter and leave the loop district of Chicago.

In 1912 80,000 vehicles were registered in Chicago, an increase of 11 per cent over the previous year. The actual increase has been greater on account of increased capacity of vehicles. Of these vehicles, over 50,000 are horse-drawn, 2,790 being motor trucks.

Teaming interests in Chicago represent an investment of \$49,500,000 in street equipment and \$85,000,000 including barns, warehouses, etc.

The annual cost of Chicago's teaming totals \$60,000,000, or about \$25 for every person within the city limits. This is not high compared with other cities with parallel traffic conditions.

The average wagon or truck in Chicago spends one-third of its time on the road and two-thirds of its time in waiting.

Railroad express companies in Chicago employ 6,130 people supporting an estimated population of 18,390 souls. Of this number 1,459 are employed in the wagon service, with 934 vehicles and 1,703 horses.

The largest express company employing 184 wagons, 420 horses, six motor cars and 349 men in its pick-up and delivery service started 25 years ago with six wagons and eight horses.

The express companies bring six fast express trains into Chicago from the east every 24 hours, carrying fifty-one cars in all. Five trains of thirty cars go east every day for exclusive express work, and two of eight cars to the northwest.

## Chicago Boasts of Its Freight Tonnage

The principal express companies operating in Chicago maintain some eighty branch offices throughout the city for redistribution and collection of goods.

Such are the main figures of the report, and they show the enormous volume of business which in a few years will be taken over by the motor truck.

By adopting the motor vehicle the two-third idle time of operating vehicles at present will be cut to one-third or less and the tonnage of vehicles will be doubled in average, so that approximately 20,000 motor vehicles will do the work of the 50,000 wagons now employed, this alone saving 163 miles of street space. Travelling at higher speed than horse vehicles traffic congestion probably will be lowered 50 per cent by the change. That the change is coming no business man who is posted doubts.

Based on average truck figures at the present time, the change will save Chicago from \$10,000,000 to \$30,000,000 a year on its hauling, reducing the per capita cost of the year to \$15 or less, instead of the present \$25. At the same time the city will be healthier, cleaner, quieter, and will employ a better, more efficient type of man on the average than at present.

One thought left out of the report as

regards the two-thirds idle time of horse teams is that this is not the result of indolent systems or traffic conditions primarily, but is caused by the horse's limitation of 15 miles per day, requiring that it rest for two-thirds its time. With motor trucks there will be no such need and speed of delivery and idle time will be subject only to the hustle and business system of the firms involved in the hauling. As trucks increase and loading and unloading systems improve the idle time necessary in a motor truck, a day's work will be continually shortened.

Chicago hopes to better control the traffic in the near future. An ordinance is pending which proposes to give the police power to arrest pedestrians who do not heed the whistle in the loop district which controls traffic at the street corners. When this is done vehicles will be able to move faster because the drivers will not be obliged to dodge pedestrians who at present pay no attention to signals.

The report as furnished is full of statistical information, and wise conclusions. Reports of future years will be awaited with interest as showing the real changes which motor delivery will make in the hauling of Chicago's industries.



# Why Motor Truck Is Superior to Horse

By William B. Stout

**A** DRY goods merchant in the west has voiced a new and to him important advantage of the motor truck and delivery vehicle over the old horse systems. This man is located in a territory where the conditions of the roads allow the use of trucks only on certain routes, but nevertheless he is enthusiastic over the motor vehicle, and boosting for good roads in his section so that he may do away with horses and wagons entirely and use motor trucks exclusively for all his delivery.

"It is true that motor trucks break down sometimes," he said, "but this is not often, and when they do you can plan ahead just when they will be fixed and ready for use again. When a horse gets sick or is injured in any way, as is the case more frequently as greater demands are being made on the horse to make good, one never knows how long it will take to get well, nor can one plan on when he will be in service again if ever.

"You rarely can totally destroy a motor truck; there always is something left to fix no matter how bad the smash, and it is a wonder how much punishment a good motor truck will take and get off with only a smashed radiator or a bent fender. You never know when your horse is going to quit entirely, and leave you with nothing to fix, and nothing to do but buy another horse or, better, a motor wagon to take his place. With the horse, too, you never know the expense that will accrue from any trivial happening, while with the motor truck you can look in the cost book and see.

"For instance, Tom, the big dray horse, may have a loose shoe, get a stone under it, go lame and through a series of complications be laid up for a month, if he doesn't die from blood poisoning. The mechanical work of fixing the shoe probably will cost a dollar, yet when that is done that is not all, there is something to get well.

"With the motor truck a nut may get loose, or a spring break, or a valve stem snap. Here is a repair costing say twice or even five times what the horse repair cost, so far as the mechanical work goes, and yet when the money is paid out and the work done the investment is ready to work again. There is no waiting for anything to get well.

"Then, too, one can worry along and finish a day's work with a leaky radiator, or a broken spring leaf or the like and have the repair done at night when the investment is idle. This cannot be done with a horse without breaking into his rest hours.

"One knows, too, just about what the minimum life of his motor truck will be, he can plan on it as an investment for a certain depreciation, for a certain number of years of service, and on its having an increasing earning power as motor trucks

increase in number so that loading and unloading and traffic operations will be less complex and quicker.

"With the horse one never knows how long it will live, but can only average. One is not sure of depreciation, and knows too that as motors increase they will be given more and more preference at crowded stations, so that the possible work of the horse is decreasing instead of increasing while the upkeep cost is increasing as well. The time will come when it will be almost impossible to use horses for delivery except in house-to-house work where there are no platform waits, for at other points the waits will be too long through preference to the more expensive trucks."

These are new viewpoints for the most part, analytical, and the result of experience, an expression of a growing feeling on the part of those progressive merchants who are keeping in touch with the advance of the motor truck as the future delivery vehicle.

## CONTRACTORS LIKE TRUCKS

Among the number of inquiries concerning motor trucks received by manufacturers during the past year by far the largest amount has been from engineering and contracting firms, according to a recent report of the National Association of Automobile Manufacturers, many of these inquiries asking concerning rental of motor vehicles for certain periods of work.

Rollin W. Hutchinson, Jr., for the International Motor Co., in discussing this work quotes some results obtained by the Crescent Delivery Co., of New York, a firm using three 7½-ton Mack trucks in addition to horse equipment for the hauling of sand, gravel and broken stone in the borough of Manhattan.

Most of the company's hauling is from the dock, located at the foot of East Thirty-fifth street, the average haul from this point being 2.9 miles. With this

short haul it is important that the loading and unloading time be kept as short as possible and that the trucks may be kept moving so that the materials are handled by a hopper system, loading into the trucks. These hoppers are filled by a derrick and clam shell bucket and operate easily.

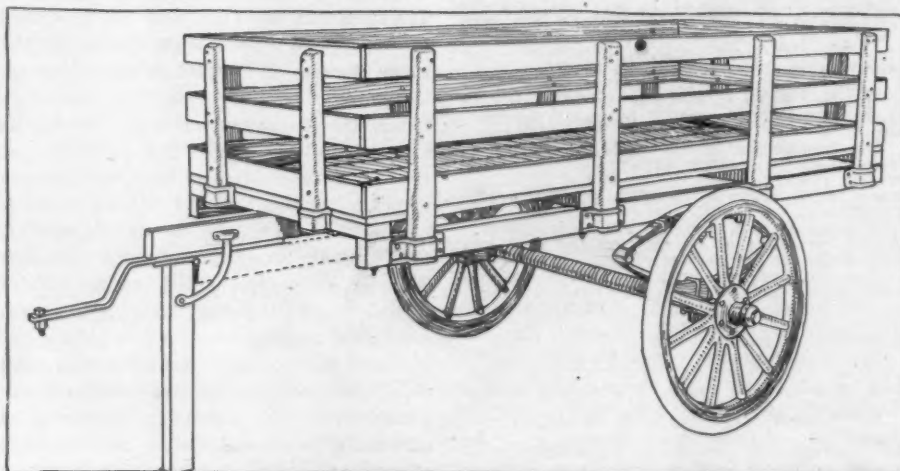
In loading, the truck drivers do not move from their seats, a helper operating the doors which let the material into the motor truck bodies, thus leaving the drivers to their business of running the car. Loaded, these run out from under the hopper at once to make room for the next vehicle, and in loading motor vehicles are given preference over horses where it is possible.

Power dump bodies are fitted, the only delay in unloading being when drivers have to hunt up the contractor's foreman to see where the load is to be dumped. These delays are rare.

Three trucks, as stated, are used, these having 5 yards capacity. Tires are 42 by 6-inch triples. The machines are geared to 10 miles an hour, maximum speed. They operate 9 hours a day, making 6.7 trips average. The average loading time is 5 minutes, unloading 8 minutes. Loads vary from 15,000 to 16,200 pounds.

On 2 consecutive days during 2 weeks of the trial the machines averaged 60 miles per day, though 39.4 miles is the average time as the machines are not now working overtime. This showing is held up as proof of the truck's utility.

If there were not the hindrance had at present through working in conjunction with slow horse equipment the machines could do much better. That Mr. Hutchinson, in telling of the work, emphasizes the service conditions and mentions the truck as the instrument in connection, only proves that he knows what is important in making any truck pay whether the machines in which he is interested or any other motor delivery vehicle. It is the business sagacity connected with truck operation that counts for successful truck operation, and that is producing experts who know how to get the most out of



MODEL A DETROIT TRAILER WHICH HAS A CAPACITY OF 1,200 POUNDS

commercial motor vehicles. The report says:

**CONDITIONS:**

Average daily mileage.....	39.5 miles
Average trips.....	6.7 "
Average length of haul.....	2.95 "
Average load.....	8 tons

**ASSUMPTION:**

300 working days per year.  
11,850 miles per year, each truck.  
100,000 miles, life of truck.

**INVESTMENT:**

Three 7-ton trucks.....\$17,400

**FIXED CHARGES:**

Inter. on \$8,700 at 6%.....\$ 522.00

**Insurance:**

Fire 2% on 80%  
of value..... 278.40

Fixed depreciation, ex-  
clusive of tires, on

\$15,450, at 10%... 1,545.00

Wages at \$22.50 per  
week..... 3,510.00

Garage at \$20 per month 720.00

Total fixed charges.....\$ 6,575.40

**OPERATING CHARGES:**

Depreciation at 1% per  
1,000 miles, for all

mileage in excess of  
1,000 miles.....\$ 285.83

Maintenance at 70c per  
mile (approximately). 2,821.00

Tires at .0809 per mile 2,877.42

Gasoline at .067 per mile 2,380.07

Oil and grease at .013  
per mile..... 468.00

Total operating charges.....\$ 8,832.32

Total cost per annum..... 15,407.72

Average cost per day..... 17.12

Average cost per ton-mile..... .108

**INSTANCES OF TRUCK ECONOMY**

On long distance hauls movers are saving 2 days out of 3 by delivering with motor trucks. A conspicuous example is that of the Liberty Storage and Warehouse Co., of New York. Recently this company delivered by Alco truck a load of household furniture to Huntington, Long Island, and return to the warehouse inside of 10 hours, covering a distance of 87 miles. The truck pulled up to the loading place at 3 p. m., was loaded, delivered its cargo and returned before 1 o'clock next morning, ready for another load.

When horses were used on such work the arrival at Huntington was made during the evening of the first day and another day was required for the return trip to New York. After such a strenuous ordeal as this the horses were not used on the third day. Aside from this saving in time by the use of a motor truck the expense of stabling the horses over night and the hotel bill of the driver and two helpers now are saved by this concern.

An instance of a motor truck saving 3 days out of 4 is that of Coutu Bros., of Central Falls, R. I. A load was moved from Central Falls to Ipswich, Mass., a distance of 75 miles, in 1 day by an Alco truck in the service of this concern. Formerly, on such trips, four horses took 4 days to make this trip. Thus the number of horses replaced by the motor truck is practically sixteen.

The saving in this particular instance is extremely large, as a 3 days' hotel bill of a driver and two helpers and the expense of stabling of four horses for 3 days are saved by the motor truck. These are only a few instances of economy.

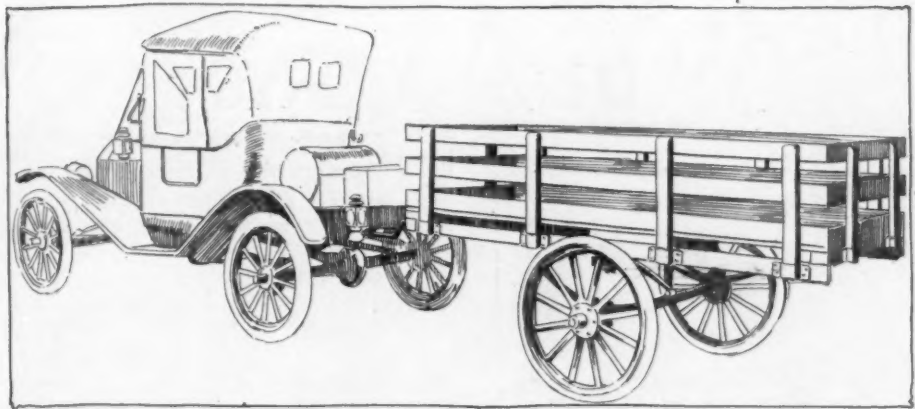


FIG. 1—DETROIT TRAILER ATTACHED TO SMALL RUNABOUT

## Trailer Proves Its Utility in Detroit

A NEW type of freight-carrying vehicle has made its appearance, in the form of a specially constructed two or four-wheeled wagon, to be drawn by a passenger car or a motor truck. It is known as a trailer. This utilization of motor cars has been made by several of the car manufacturers, in Detroit at least, who have put some of their factory cars to freight use by constructing two-wheeled contrivances from surplus parts, such as frames, extra axles and wheels and towing these trailers, putting them to the same service as they would light delivery vehicles.

Recognizing the demand for such vehicles, the Detroit Trailer Co. has brought out a trailer of this type, constructed entirely of standard motor car parts, as a solution of the light delivery problem. The method of use and the general appearance of the Detroit trailer is shown in Fig. 1, which illustrates the attachment to a small runabout.

In enumerating the many uses to which such a contrivance may be put, the concern states that it is of special interest to contractors, grocerymen, hardware men, dry goods houses, farmers, summer residents and tourists. The last two types of users may appear rather doubtful to many, but the concern points out that summer residents will find it very convenient in transferring different articles and baggage to and from the city, while tourists are assured that the trailer may be attached to the machine to carry the always great amount of extra baggage needed on a tour, thus leaving the motor car unhampered and not loaded up with baggage. Another suggested possibility is for camping trips, for transporting the camping outfit.

These trailers are made in two types, models A and B, the former being a two-wheeler and having a capacity of 1,200 pounds. It has a standard I-beam axle and the wheels are of the artillery type of second growth hickory, provided with standard solid rubber tires, size 32 inches by 2 inches. These wheels are mounted on Bower truck type roller bear-

ings, while the frame is suspended from the axle by regular full elliptic automobile springs. The dimensions of the stake body for model A are 96 inches length and 42 inches width. The sides are 18 inches high. This smaller type is also furnished with a canopy top, either with a square or round bow, for camping or fishing parties.

The makers convey the further information that the vehicle also can be furnished with special springs for sleeping in the trailer, while an ice box attachment fastens directly under the rear end, at extra cost.

The model B trailer is a four-wheeler. It is also constructed of standard truck parts and the body is suspended by semi-elliptic springs from standard I-beam axles, the wheels of artillery type being carried on Bower roller bearings. This heavier model has a wheelbase of 130 inches and a capacity of 3 tons. It is suitable for use in connection with any standard truck or 1-ton capacity or over and is intended for the delivery of coal, lumber and so on. It is claimed to be really a 3-ton truck, minus the engine and transmission. The overall body dimensions are 16 feet length by 54 inch width.

### PRAISE FOR PHILIPPINE TRUCKS

The annual report of the director of public works of the government of the Philippine Islands for the fiscal year ending June 30, 1912, Warwick Greene, director, speaks highly of the de Dion-Bouton trucks purchased in New York 3 years ago. The report is as follows:

During the year this line carried over 19,000 passengers without accident or injury to any of them. Considering the conditions under which this motor service is maintained, this result is considered remarkable and may be attributed to the strict discipline maintained and to following railroad practice in running the motor trucks in trains and regulating the traffic with regular block system, with gates, gate keepers, and telephones. The main reliance of the line is placed on eighteen trucks of which seventeen were especially built by the de Dion-Bouton company for service on the Benguet road and one by the same firm for use in Baguio as a bus. These cars have given splendid service and leave nothing to be desired. During the year 5,161 tons of 2,000 pounds each were carried under the direction of the motor line, for the greater part by de Dion-Bouton trucks.



# With Accessory Makers

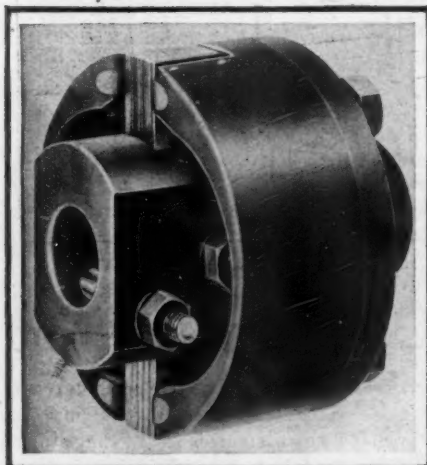


Fig. 1—Bosch adjustable coupling which permits magneto to run out of line and off center without injuring the magneto

## Hitenograph Magneto Tester

WE have machines for telling if the oil in the motor is circulating properly, if the gas line is in working order and other such devices, but now comes an apparatus for telling whether or not the ignition system is in proper order and if not, why not. The Hitenograph is the name of the instrument and it was given its name by the inventor, Francis R. Hoyt, Cleveland, O., from the fact that it is a high-tension graphic recorder.

The magneto to be tested is coupled to the Hitenograph as shown in Fig. 3. Upon the drum D of the machine is a chemically prepared chart. The handle C is revolved and the current from the magneto traveling from A to B is recorded upon the chart. A section of a chart is shown in Fig. 2. The lines across the chart represent degrees of crankshaft rotation. The chart is divided into 180 degrees and travels twice as fast as the magneto being tested.

Taking a four-cylinder magneto, which sparks twice for every revolution, two indications will be made on the chart for every revolution it makes. Now each graphic representation of a spark must fall on the same line of the chart as the spark preceding it. The size of the mark on the chart shows the relative size of the spark. In A, Fig. 2, the magneto is out of time 5 degrees. That is, there are 5 lines between the registrations. The upper row of marks, the small ones, represent the magneto running on a retarded spark; the lower set on advanced spark.

At B in the same illustration is a record of the sparks after the magneto had been synchronized. By the use of the Hitenograph it is possible to tell at a glance whether the magneto is living up to its rated efficiency and also whether

the adjustments are correct. The apparatus is about three times as large as an ordinary magneto, as may be seen from Fig. 3.

## Bosch Adjustable Coupling

Manufactured by the Bosch Magneto Co., New York, the coupling shown in Fig. 1 consists of a cone-shaped piece of steel which is attached to the armature shaft, terminating in a ring having diametrical fiber-lined slots. To the driving shaft is attached a flange which carries a flat cross-bar. The cross-bar, which is made of steel leaves, fits into the slots of the cone-shaped part. Because of the fact that the cross-bar is laminated its action is similar to that of a spring, thus permitting the two members of the coupling to have rela-

which taper bolts pass, is fitted to the armature shaft. When the nuts on these bolts are drawn tight there is no relative motion between the two parts. Loosening of the nuts permits the magneto armature and a part of the coupling to rotate.

## Thermite Anti-Freeze

With the claim that it will not freeze except at 70 degrees below zero, the Northwestern Chemical Co., Marietta, O., is offering Thermite of a different nature than that previously marketed. Since the lowest temperature reached usually is 15 degrees below zero, the Thirmite is diluted with water according to conditions. The maker claims that the solution will not affect the metal of the water-jackets or the radiator and also that the rate of evaporation is so small as not to be taken into consideration. It is said to be non-explosive and non-inflammable.

## Dim-A-Light for Headlights

In many cities the use of powerful headlights is prohibited, due to the fact that the rays are blinding to the driver coming in the opposite direction. A device is being manufactured by Pellet's Magneto Exchange, Chicago, which permits of the headlights being dimmed when another car is approaching. A button on the dash is pressed and a resistance is inserted into the lamp circuit which cuts down the current flowing to the headlights and hence they give less candlepower. The apparatus is made to be fitted to various circuits employing standard candlepower lamps. The maker claims that little time is required to put the Dim-A-Light in position, as all that is necessary for installation is a pair of pliers, a knife and a screwdriver.

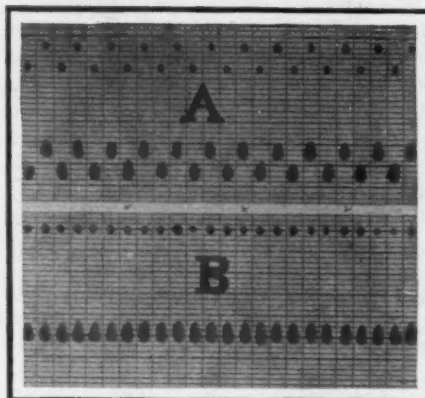


Fig. 2—Chart of Hitenograph. The registrations at A shows the magneto to be out of time 5 degrees; at B the machine registered correctly

tively slight twisting movement. This permits the two shafts to be a little out of line. A flange with three holes through

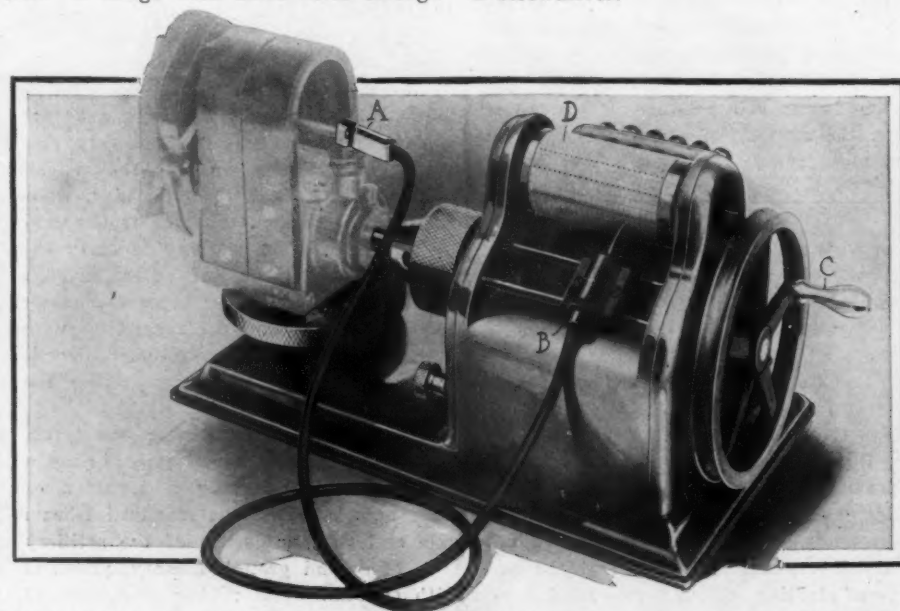


Fig. 3—Magneto testing apparatus known as the Hitenograph. Upon the chart D is registered the time of spark occurrence and the intensity of the spark



GARAGE OF W. F. BURROUGHS, CHICAGO, AN EXAMPLE OF A WEL-EQUIPPED AND ROOMY BUILDING

## Housing the Motor Car *The Garage for the Monied Class*

MANY owners of motor cars equip their private garages with facilities which enable the chauffeur to repair and overhaul the car. In the garage owned by W. F. Burroughs, Chicago, nothing has been neglected to bring it to the peak of up-to-dateness.

The brick building is 35 by 30 feet, with the garage on the lower floor and the chauffeur's quarters on the upper. There are four large rooms on the second story which are lighted during the day partly by skylight and partly by windows.

### Plan of Garage

A plan of the garage floor is illustrated on this page. There are two rooms, one the garage proper and the other the repair shop, there being no door between the two rooms. The striking feature of the garage is the fact that it is well lighted. There are seven windows, three of which face the rear of the owner's home. Besides the light that enters the windows auxiliary facilities are at hand in a number of cluster lights and wall lights. The single entrance for cars is 8 feet wide and about 11 feet high. A drain is provided and is so positioned that should the car be washed in the daytime, the light from the windows enters, and if at night, the cluster lights provide illumination. With the car out of the garage a decidedly clean floor appears, the greater part of the garage apparatus being placed in the ante-room.

This is about 30 by 15 feet and contains the boiler room for the hot-water heating

system. Next to the boiler room is a small work bench. A feature of the repair shop is the pit, in front of which is the gasoline pump, which is used to bring gasoline from the underground tank to the repair shop. The pit is about 6 by 2½ feet, which is ample for the car housed.

### Covered Repair Pit

When not in use the pit is covered with planks of wood to prevent anyone falling into it. Drop lights are provided, so that when working underneath the car

repairing is facilitated to some extent.

The walls are whitewashed and the floor is cement.

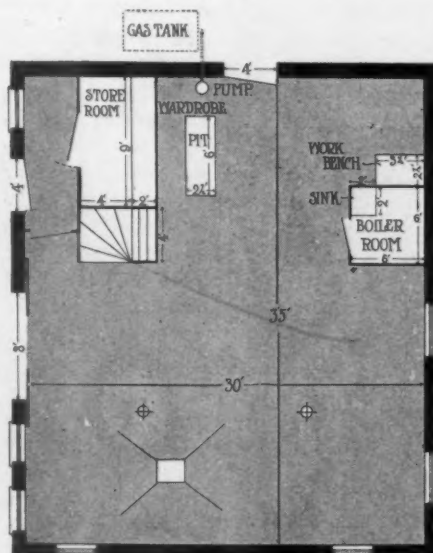
A very convenient location for the sink is provided in the garage of Mr. Burroughs. This may be noted from the floor plan illustrated below. When water is needed for cleaning the car a hose connection is made with the faucet, thus eliminating the necessity of having a separate water pipe near the drain. The sink is handy also to the work bench.

Two doors are provided for entrance to the garage by persons. One opens to a stairway which leads to the upper story and the other faces the lawn at the rear of the building.

Adjacent to the store-room is a wardrobe for the storing of the motoring robes of the car owner. This room is about 9 feet long and 4 feet wide. Behind it is a stairway leading to the four-room apartment on the second story. Besides, the tools are kept in the store-room, together with cans of oil. Undoubtedly the spaciousness of the building adds much to its appearance. The fact that it is made of the same material as the home of the owner makes it blend cheerfully with its surroundings.

### Two Drives to Garage

There are two drives leading to the door of the garage, one on either side of the owner's dwelling. These are about 7 feet wide and terminate in a bank at the garage door. Grass plots about the building add also to its bright appearance.



FLOOR PLAN OF W. F. BURROUGHS' GARAGE, SHOWING SIMPLICITY OF ARRANGEMENT



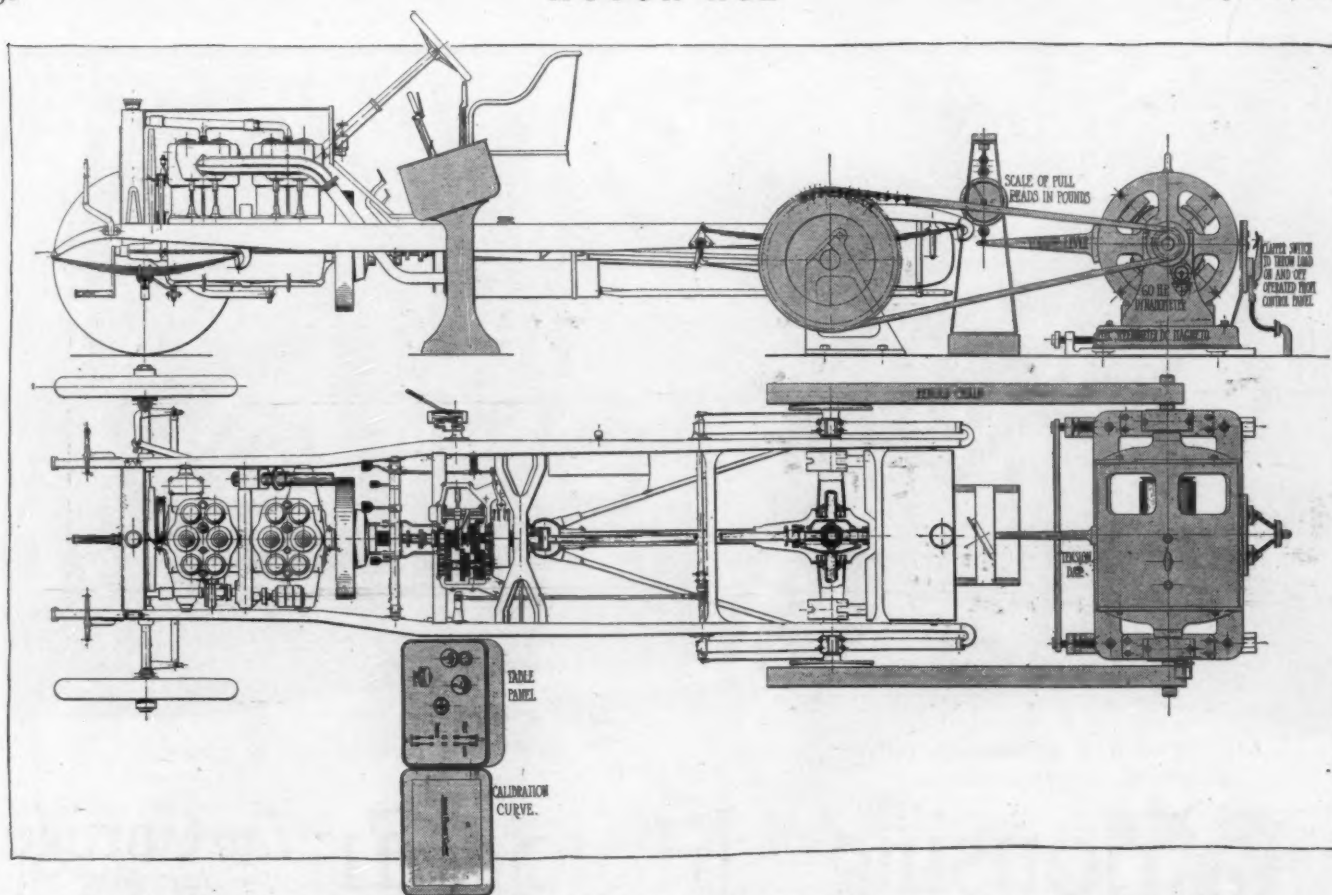


FIG. 1—DEAN CHASSIS TESTING APPARATUS BY WHICH ROAD TESTS CAN BE DUPLICATED IN PART IN THE FACTORY

# Testing Motor Car Chassis and Engines

## Details of New Apparatus for Finding Brake Horsepower

By P. P. Dean

SINCE various municipalities have been considering bills by which manufacturers' test cars may be kept off the public highways, especially the Indianapolis instance, motor car manufacturers have been seriously considering a means of substituting the usual road test by some good and reliable stationary method.

It is granted, of course, that a running road test is necessary in order to try the various members of the chassis, such as the springs and brakes, but only for a

short time over a severe course. Three alternative methods are presented; firstly, to build a private track; secondly, to test on a public speedway for which a fee is charged, and lastly, to install a series of stationary chassis testing stands.

### Supplements Road Tests

An ideal way would be to use the stationary test supplemented by a 50-mile run over a rough field adjoining the works.

The best machine on which to absorb the load on the rear wheels has yet to be ascertained, but the method herein set forth and described seems to answer the purpose in every way.

Fig. 1 shows a complete layout, with chassis, driving chains and dynamometer in place. The load absorbing dynamometer is of the Diehl electric cradle type, dissipating electrical energy

through a grid resistance, or feeding it back to the line. The particular size shown is capable of taking care of any normal standard chassis, and provides continuous breaking power equal to 50 horsepower at the wheels, at a speed equal to 60 miles per hour, the limiting factor, however, being the speed of the driving chains.

The method of supporting and attaching the chassis shown in Fig. 1 has been superseded by the testing stand which is not shown. This is designed especially for cars using the floating type of axle, but, of course, can be adapted to those using either the three-quarter floating or semi-floating axle. Before the complete chassis leaves the shop two dummy test axles are inserted through the housing and into the differential, each having the male end of a jaw clutch extending outward, which engages the female half of the clutch attached to the stand. This half slides on a feather key. Attached solidly to the floor underneath the spring pads is a pair of hydraulic jacks, with special head to suit the axle housing. These jacks are adjustable in a lengthwise direction, so that the jaw clutches may be lined up with a minimum loss of time.

Each stand contains a pair of oil-ring bearings, supporting between them a shaft

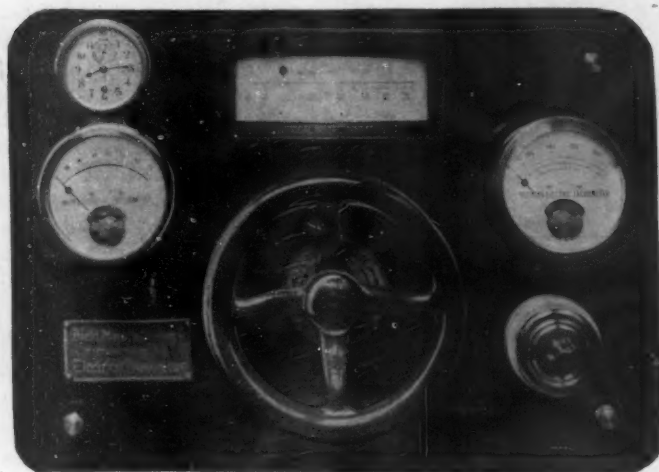
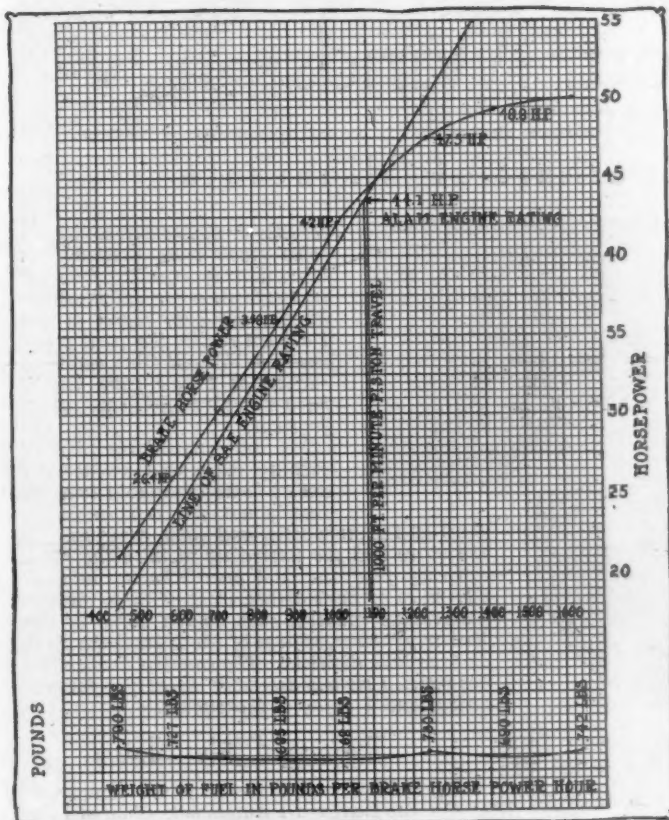


FIG. 2—CONTROL AND CHARTING TABLE SHOWING STEERING-WHEEL CONTROL OF ELECTRIC CURRENT



carrying the ninety-tooth chain wheel. The base of each has four lugs, through which holding-down bolts pass to girders let into concrete. The two large chain sprockets, when once accurately lined up with the dynamometer pinions, need not be altered, so always insuring the proper working of the differential gear. It is noticed that the axles merely exert turning effort, the same as when in actual operation, and take no driving strain of the chains.

Belted from the dynamometer shaft is a centrifugal volume blower, supplying air for cooling the radiator, which air is led through a duct, terminating in a flared outlet covering the front of the radiator. The speed of the blower is so arranged as to deliver air at a velocity equaling that produced by the car traveling at different speeds.

## The Control Board

Now that the chassis is ready for operation, attention is first directed to the engine, which is started by its own starter or cranked over. The clutch is released and the operation under no load is noted, but not recorded, on the log sheet, unless it is desired to call attention to some particular points.

To control the loading of the chassis, a master-control board is used, consisting of a slate switchboard mounted in a cast-iron pedestal box. This box has a hinged cover and support, which serves the manifold purpose of protecting the expensive measuring instruments, and also

and tested at will at either gear position and through any length of time desired.

After the chassis has been adjusted to any given load, the testing operator may examine every part under working conditions, and make the following observations: Best possible carbureter and spark setting for different speeds, action of transmission gearing, lubrication of gear-set, ease and quietness of running of gears and differential, effect of muffler and cutout, temperature of cooling water, temperature of exhaust, consumption of fuel, and many other points. The horsepower meter does not show the actual power delivered by the rear wheels, but shows at a glance whether the power is increased by various adjustments, which is a very important factor.

For actual horsepower measurement the weight shown on the scales at various speeds must be recorded and afterwards converted by the aid of the chart to horsepower.

a support for the horsepower conversion chart and log sheet. The face of the board is shown in Fig. 2, and contains a Hopkins speedometer, reading miles per hour, calibrated to suit different wheel diameters, a similar instrument showing revolutions per minute on the dynamometer, a Keystone horsepower meter, a load-varying rheostat, and a load switch.

To provide a minimum load, the small load switch is turned, which closes the automatic solenoid switch mounted on the sorbing resistance across the dynamometer terminals. A turn of the large handwheel on the panel varies the brake power on the rear wheels from zero to the maximum capacity of the car, so that it may be loaded

For fuel consumption tests the gasoline is supplied from a 50-gallon tank, mounted on a portable stand, forming part of a fuel weighing recorder which is so arranged that it shows the exact time in which 1 pound of fuel is consumed, together with the exact number of revolutions or miles per hour, made by the chassis in that time.

Mounted on a slate panel is a telegraph relay and transmitter connected mechanically to a split-second return stop watch, while geared to the dynamometer shaft is a Veeder revolution counter magnetically thrown in and out of gear.

### Operation of Test

When the chassis is operating under any given load, the sliding poise on the scale beam is set so that it almost floats, but remains in the upper position. As soon as the engine has consumed enough fuel to decrease the weight, the beam falls and the poise is set at 1 pound less, when the beam rises again. As the beam drops, it strikes the transmitter contact of the relay, which action automatically starts the stop watch and also throws in gear the Veeder counter. As soon as 1 pound of fuel has been consumed, the scale beam again falls and, through the relay, disengages the gears on the Veeder counter and stops the watch, thus recording accurately the exact time consumed and number of revolutions of the rear wheels in which 1 pound of gasoline is used.

On a road test no measurements of value may be taken, and it is very seldom that a car may be operated at its maximum capacity and speed for more than a few minutes, without disobeying the laws and risking an excess speed fine, all of which may be eliminated by testing at home.

The whole of the equipment above described has been designed by the writer, and is manufactured by the Diehl Mfg. Co., Elizabeth, N. J.

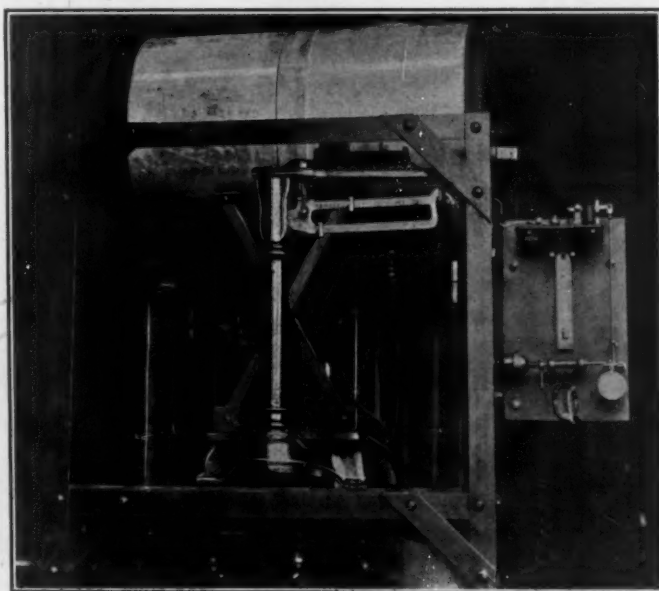


FIG. 4—ARRANGEMENT FOR MEASURING FUEL USED  
A stop watch, telegraph relay and scales measure time and number of revolutions required to use 1 pound of gasoline





# From the Four Winds



## Governors Who Motor—Eberhart of Minnesota

**G**OVERNOR A. O. EBERHART of Minnesota is a motorist. He disdains the service of the chauffeur. He drives himself. Frequently he makes public use of his car, as on one occasion when the German Americans had a celebration in the Twin Cities he drove at the head of the parade with leading lights in his car. Frequent speaking engagements in Minneapolis he fills by motoring over from his residence, and he drives out to the summer capital at St. Albans, Lake Minnetonka, when called to the cities.

"Since I began driving my own car 3 years ago I have become a devoted motorist," says the governor. "While I always enjoy a ride in a swiftly-moving car the real thrill doesn't come unless I am at the wheel myself. Even when riding with a friend I invariably keep my eyes on the road on the lookout for other



vehicles or obstructions, and become much more excited than when driving myself. I do not feel safe in a car unless at the wheel. My only regret is that I did not realize the great pleasure to be derived from motoring earlier, as I now learn that I have missed many years of enjoyment.

"I am particularly fond of evening rides and whenever I am at home invariably take my family out for a spin in St.

Paul and Minneapolis, and their environs. In the cities and the immediate vicinity the roads are very good, the park boards having laid out 200 miles of park drives, most of them through picturesque country, such as the gorge of the Mississippi river, valleys of the Minnehaha creek and the lake districts. The country roads while not exactly models are most delightful for motoring, and I enjoy it thoroughly."

### Good Roads Brevities

**W**ORK has been begun on the motorway to connect Dallas and Del Rio, Texas. The latter town is on the Mexican border. The road thus will span nearly the entire state from north to south. The road will be a privately-owned toll road, which will be used exclusively for motor vehicles.

The Ohio state highway commission has sent out inquiries to every county in the state visited by high water, requesting reports on damage done and probable cost of reconstruction. These are now beginning to come in. As a result of the general flood conditions, a movement is on foot to secure such legislation as will permit the highway department to pay a part of the cost of bridge construction. At present the department is authorized to draw plans and prepare estimates for bridge construction, but may not pay any part of the cost of their building.

Business men of Sterling, Ill., extended a hospitable greeting to 125 good roads boosters from Rock Island, Moline, Hillsdale, Erie, Lyndon and other places between Rock Island and Sterling. It is desired to route the proposed ocean-to-ocean highway through the cities mentioned.

Thirty-two miles of concrete roads and approximately 100 culverts and small bridges will be constructed by the county of Milwaukee under direction of the county highway commissioner and the state highway commission this year. Last year 14 miles of concrete road were built and some of the 1913 work will be extension of these improved highways. The roads to receive the greatest benefit of the highway plan this year are: Leading south from Milwaukee, Howell, Loomis, Janesville, Kilbourn, Chicago, Mukwonago roads; leading west, Blue Mound, Hawley roads; leading north, Cedarburg, Port Washington, Green Bay and Fond du Lac roads. The work is done under contract, the county furnishing all materials and machinery. The contractor furnishes the labor and is bound to execute the work as planned.

A contract has been let by the municipal government of Buenos Aires providing for the construction of an asphalted motor driveway along the Rio de la Plata, in front of the city. This will mean an outlay of \$1,255,000.

**G**RANT to Drive Isotta—Harry Grant, of Boston, twice winner of the Vanderbilt cup, has decided to join the racing field again, and he has just signed a contract to drive the Isotta-Fraschini car owned by young Ziegler, who inherited millions from the late baking powder millionaire.

**Cash Prizes for Indianapolis**—The Bosch Magneto Co. has added \$1,000 to the 500-mile Indianapolis race purse, offering \$500 for first, \$300 for second and \$200 for third in case Bosch magnetos are used. The Hartford Suspension Co. gives \$250 to first, \$150 to second and \$100 to third where Truffault-Hartford shock absorbers are used.

**Eastern Interclub Planned**—Plans are under consideration for holding an interclub run from Philadelphia to some point in Pennsylvania during the early part of June, Gettysburg probably to be the objective point of the tourists. The event will be conducted under the joint auspices of the Quaker City Motor Club, the Automobile Club of Philadelphia, the Automobile Club of Germantown and the Delaware County Automobile Club. Details of the run have been placed in the hands of a committee consisting of a member from each of the four organizations. It will be a 1-day affair.

**Traffic Rules Irksome**—New Orleans traffic regulations, which are considered unfair to owners and drivers of motor cars, probably will be changed owing to the determined onslaught that is being made by the Louisiana Motor League. A speed limit of 8 miles an hour in the business district and 12 miles an hour in other sections of the city is a hardship, it is claimed, and maximum speeds of 12 and 25 miles an hour are recommended. The regulation making it necessary for a motor car to be 30 feet behind a street car when the car

### Recent Club News

**A**T THE annual meeting and banquet of the Davenport Automobile Club, of Davenport, Ia., new officers were elected for the ensuing year as follows: President, J. Reed Lane; vice-president, M. R. Carlson; secretary, Gus Burmeister; treasurer, A. F. Dawson; directors, G. Decker French, Lee Dougherty and Bert Halligan. Reports showed an increase in membership of 50 per cent.

Plans for the erection of a new club house for the Peoria Automobile Club, of Peoria, Ill., were perfected at a meeting of the board of directors. More than half the money necessary has already been subscribed and no difficulty is anticipated in securing the remainder. The structure will be erected at a picturesque point on the Illinois river convenient to the city. It will be equipped with a dancing floor.

The Tacoma Automobile Club is preparing for a busy summer. On May 4 the club members will make the run to the Nisqually power plant; 2 weeks later a membership dinner will be held; then on May 25 a run will be made to Olympia; a run to Seattle and trip over the famous boulevard system, June 15; a run to Centralla and Chehalis, June 29; a run to Aberdeen and the coast, July 13; a run to Mt. Tacoma, August 3, and a run to Lake Cushman, September 1. Attractive club rooms at 1512 National Realty building have recently been opened and placed in charge of Secretary A. L. Sommers.

The Superior Automobile Club, consisting of motorists of Douglas county, Wisconsin, at the head of the lakes, is planning to build a country club this year. No location has been definitely selected, but it is likely that one of the many river or lake sites in the county will be chosen. The club will invest from \$12,000 to \$17,000 in building and grounds.

The new home of the Automobile Club of Canada was officially opened last week in the new Birks building, Phillips square, Montreal. The growth of the club has been phenomenal. Started in the year 1904 with only a few members it has gradually forged ahead until at the present time more than 500 owners have attached their signatures to the membership rolls. An aggressive campaign for more new members has been started.

stops and the rule forbidding a motor car to pass any other than a moving street car are declared to be unnecessarily burdensome. A request also is made to permit the use of strong lights on cars. The condition of many of the side streets are such as to make them necessary, it is stated.

**Another Chance for Motor Car**—A bill has been introduced in the present session of the Illinois legislature and is now on its second reading, providing for the free transportation of school children of the rural districts from their homes to the township or district school. Inasmuch as this bill is practically sure of its passage, it may mean a new field for the motor car.

**Active Month in Ohio**—The monthly report of the Ohio state registrar of motor cars shows the month of March to have been an active one. The receipts of the office since the first of the year have totaled \$222,794, which, after paying the running expenses, will be turned over to the state for the improvement of highways and bridges.

**Badgers Prepare for Contest**—A meeting of the executive committee of the Wisconsin State Automobile Association will be held during the week of April 13 to make preliminary arrangements for the fourth annual Wisconsin state reliability tour for the Milwaukee Sentinel trophy for trade classes and the Emil Schandelin trophy for amateurs. The run will be conducted some time in July and will probably again last 5 days.

**Car with Mileage Record**—A total distance of 130,000 miles in 5 years, the only time off each year being 2 weeks in March for general overhauling, is the record of a 1908 Locomobile landaulet owned by Frederick H. Johnson, of Syracuse, N. Y. For 250 running weeks the car has averaged better than 500 miles a week or has maintained a daily average of 74 miles. During this hard service the only work done on the car has been to install new piston rings when the motor was overhauled. Twenty times the car has been

driven the 360 miles from Syracuse to Boston, returning to Boston by way of New York. During the 5 years of constant

## Coming Motor Events

### SHOWS

April 5-12.....Pittsburgh, Pa.  
April 13-19. Pittsburgh, Pa., Commercial show  
October.....Paris salon

### CONTESTS

\*April 16-17—Track Meet, Taylor, Tex.  
\*April 17—Track Meet, San Antonio, Tex.  
April 27—Hill-climb, Limonest, France.  
April 28-30—Truck run, Chicago Motor Club, Chicago.  
April 29-May 2—Reliability, Columbus Automobile Club, Columbus, O.  
\*May 5-8—Truck reliability of Washington Post, Washington, D. C.  
May 11-12—Targa Florio road race, Sicily.  
May 14-15—West Hudson and Catskill tour.  
May 30—Interclub reliability, Chicago Motor Club-Illinois A. C.  
\*May 30—Indianapolis speedway meet.  
June 19—Algonquin hill climb, Algonquin, Ill.  
\*June 25-29—Chicago Automobile Club reliability to Boston, Mass.  
June—Tour Iowa State Automobile Association.  
July 1—Indianapolis to Pacific coast, tour; promoted by Indiana Automobile Manufacturers' Association.  
July 1-16—Motor plow competition, Winnipeg, Can.  
July 4—Track meet, Taylor, Tex.  
July 4-6—Road race, Tacoma, Wash.  
July 12—French grand prix.  
\*July 7-14—A. A. A. endurance run, Minneapolis to Glacier Park, Mont.  
\*July 27-28—Tacoma, Wash., road race.  
August 29-30—Elgin road races.  
August 30-September 6—Reliability run, Chicago Motor Club.  
September 1—200-mile track race, Columbus, O.  
September 21—French light-car road race, Boulogne.  
September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.  
October 4—Start of Chicago Motor Club's around Lake Michigan reliability.  
\*November 24—Vanderbilt road race at Savannah, Ga.  
†November 27—Savannah grand prix.

### MEETINGS

April 24-25—National Good Roads Federation, Birmingham, Ala.  
June 5-7—Mid-summer meeting S. A. E., Detroit.  
June 23-28—International road congress, London, Eng.

\*Sanctioned by A. A. A.  
†Sanctioned by A. C. A.

running the average distance covered on each set of tires has been 4,000 miles.

**Wisconsin's Registrations**—Approximately 15,000 Wisconsin motor cars had been licensed for 1913 up to April 1, according to the report of the secretary of state, indicating that the 1912 figures of 26,000 registered cars will be greatly exceeded this year. On April 1, 1912, only 9,750 cars had been registered. This year's registration has been surprisingly large, because as late as April 5 Milwaukee motorists were driving with 1912 license plates, meaning that a large number have not yet taken out new licenses. In addition to the 15,000 private owners registered, there are 925 dealers on the books thus far this year.

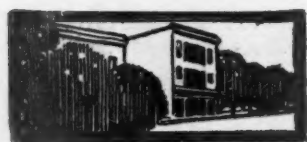
**Milwaukee Fixing Streets**—After June 15 tourists will be more welcome than ever to the city of Milwaukee, for on that date Grand avenue, the principal thoroughfare of the city, and at the same time one of the worst streets, so far as paving is concerned, will have been thoroughly repaved and motorists will no longer have to bump the bumps in passing through the business district. Contracts amounting to \$175,000 for asphalt paving on Grand avenue were awarded April 4 and under the specification the work must be completed by the middle of June.

**New Taxation Scheme**—Another bill has been introduced at Lansing, Mich., this time by Representative Hinekley, providing for an ad valorem tax, motorcycles and traction engines to be levied in the same manner as the present property taxes are imposed. Hinekley's bill would make it necessary for each section's assessor to place the value on all motor cars, traction engines and motorcycles within his district, at their actual cash value and keep a complete list of all cars, with descriptions of each. Counties having road systems would receive the proceeds of this tax for their road funds, while other counties would have that collected apportioned among the townships.



PREMIER TEST CARS USED TO HAUL ROAD DRAGS IN VICINITY OF INDIANAPOLIS AFTER FLOODS





# Among the Makers and Dealers



**CHANGE of Name**—The Rapp Mfg. Co., of Toledo, O., has filed papers with the secretary of state changing its name to the Toledo Spark Plug Mfg. Co.

**Hendrie Prepares to Build**—W. C. Hendrie, president of the Hendrie Rubber Co., has let the construction contracts for the first unit of what is to be a \$100,000 tire factory at Torrance, Cal.

**South Dakota Dealers Organize**—Fifty retail dealers have formed the South Dakota Automobile Dealers' Association to promote trade welfare. The officers: President, T. P. Blain, Redfield; vice-president, A. W. Tyner, Webster; secretary, H. B. Watkins, Redfield.

**Moves to South Framingham**—The Standard Woven Fabric Co., maker of Multibestos brake lining, is to move from Worcester to South Framingham, Mass., where larger quarters have been secured, a three-story concrete building having been erected there for the company that will be finished in a couple of months.

**Case Opens New Foundry**—The new \$1,500,000 foundry of the J. I. Case Threshing Machine Co., adjoining the motor car works of the concern at Racine, Wis., will begin operations about April 15. The foundry will take care of casting and other foundry work now parceled out to eighteen outside foundries, besides much new work planned by the Case company. A feature of the mammoth foundry is a freight elevator of 16 tons capacity, one of the largest ever constructed.

**Coronet Making Recorder**—The Service Recorder Co., Cleveland, O., announces that the Coronet Mfg. Co., Wade building, Cleveland, has taken over the Coronet hub-mile recorder, but that the Service travel recorder which the Service Recorder Co. has been marketing for more than 2 years is still controlled by the Service Recorder Co. The two concerns are entirely distinct, and neither has any interest in the other company or in the other company's product.

**Klinekar Changes**—Several changes have been made in the sales department of the Kline Motor Car Corp., manufacturer of the Klinecar, in Richmond, Va., recently, which have resulted in the appointment of William P. Sieg as manager of the company's branch in York, Pa., with Pennsylvania and part of Maryland as his territory. Charles E. Sweeney, heretofore assistant sales manager, and Sam W. Meek, treasurer of the company, will be in charge of the sales and advertising departments at the factory. Charles E. Wilson, formerly assistant sales manager for the Mercer Automobile Co., Trenton, N. J., has been appointed district manager for the Klinecar in New Jersey, with head-



One of the features of the Waverley Georgian brougham is the battery box. Realizing that it is impossible to conceal it, the designer has endeavored to beautify it and has produced an idea that makes the battery box representative of the Waverley

quarters in Trenton, and A. E. Steele has accepted a similar position for the company in New York state, with Buffalo as his headquarters.

**Moving to Canada**—The Toledo Motor Truck Co., located on Spencer street, is to be removed to Moose Jaw, Saskatchewan, in western Canada, according to the announcement of the owner, Edwin Tait. The machinery is now being packed for removal to the new quarters.

**Menominee Expanding**—The Menominee Motor Truck Co., of Menominee, Mich., formerly D. F. Poyer & Co., builders of Menominee commercial cars, has purchased a tract of 12½ acres adjoining its present works and will begin a series of extensions and additions on May 1.

**Decision for Studebaker**—The United States district court, sitting at Omaha, has handed down a verdict for \$62.50 in the civil suit of N. P. Berger against the Studebaker Corp., Detroit. The sum allowed was to cover the trip Berger made from Omaha to Detroit, which ended in the sundering of relations between the parties. Berger, who had been manager of the Studebakers' Omaha branch, sued for salary and commissions aggregating \$7,576.76. The Studebaker attorneys placed in evidence an agreement of settlement in full, signed by Berger, nearly 2 years ago.

**Garford in Metal Deal**—Walter F. Brown, a Toledo attorney, has returned from London, bringing with him the American rights for the manufacture and control of light metals of which an alloy of aluminum is the most important. The new metal is called aeromin and is said to have twice the tensile strength of aluminum. The metal has been in use in England for several months and the American rights were secured for the Garford Engineering Co., in which Arthur L. Garford, of Elyria, has the largest interest. Mr. Garford is now in California. Immediately upon his return a meeting of the company's directors will be held and a location determined upon for the manufacture of the new product. Mr. Brown is

president of the company, which is capitalized at \$100,000, and it is believed that Toledo will be selected for the site of the new plant.

**Jeffery Celebrating Anniversary**—The Thomas B. Jeffery Co., Kenosha, Wis., will this year celebrate the fortieth anniversary of its entrance into the manufacturing field.

**Not Moving, Establishing Branch**—The Perfection Spring Co. states that it is not planning to move its factory to Toledo. Instead, it says, it is erecting a branch in Toledo in which to make springs for Overland cars.

**Makes Traveling Record**—On his return from a trip through the south, Fred J. Titus has just rounded out what is probably the greatest distance covered by and motor tradesman during the past 12 months. Mr. Titus estimated that his travels in the interest of establishing selling agencies for Alco cars and trucks totaled 80,000 miles, an average of 219 miles every day in the year. His journeys carried him from Alberta, Canada, to Florida, and from Maine to Texas. This in keeping with Titus' record in the bicycle days, when he held the 1-hour American bicycle record.

**Delivery Decision Favors Dealers**—The Leominster Garage and Auto Co., of Fitchburg, Mass., won the suit brought against it by Charles M. Boutwell and Charles A. Adams, in which it was alleged that the motor company failed to live up to its contract in delivering the motor car at the time specified in the contract and also that the car was not as represented. The case was heard by a jury, and motor dealers in the Bay state were interested in the outcome because of the question of not delivering the car on time. The motor company put in evidence to show that the plaintiffs ordered the machine painted a different color and to this fact was due the delay of delivery. The jury took this view of the case and returned a verdict for the motor company on both specifications.

**Invading Canada**—Leading to the concentration of the motor industries of the dominion of Canada in Windsor, Ont., it develops that four large manufacturing concerns have located branches in the border town across from Detroit. The Detroit Steel Products Co. has taken steps for the incorporation of a \$400,000 branch. The plans are said to be prepared for the first building at an estimated cost of \$50,000. The steel products concern manufactures steel parts for motor cars, such as springs, steel window frames and other steel parts. The Kelsey Wheel Co. has purchased 4 acres of Canadian property at Windsor for the making of motor car

wheels for its Canadian trade. The Vincent Steel Process Co. and the Swedish Crucible Steel Co. have also recently established Canadian branches at Windsor.

**Two Coast Shows Dropped**—San Francisco and Los Angeles will have no motor car shows this year. There has been some talk of a truck show in San Francisco, which, it is stated, will be put on within a short time.

**Flood Delays Deal**—The Weller-Thomas Co., recently incorporated by Zanesville, O., capitalists, is planning to erect a plant for the manufacture of motor-driven fire apparatus. The high waters of the latter part of March may make it necessary to postpone the arrangements. The concern was incorporated at \$1,000,000.

**Brown Buys Perfex Control**—Paul Brown, Jr., president of the Perfex Co., of Los Angeles, builder of the roadsters of that name, has bought control of the corporation and added more capital. One of the first moves of the company was the increasing of factory space for an added output of cars.

**New Building for Esterline**—The Esterline Co., manufacturer and engineer, Lafayette, Ind., has outgrown its present quarters and is now occupying a new three-story factory on South street in Indianapolis, and by May 1 will have increased its working space over double. The company will use the new plant for the manufacture of Golden Glow electric lamps, as well as the Esterline electric starting and lighting system and the Esterline Graphic motor. The factory in Lafayette is operating to capacity and will be continued until fall, when it will be merged with the Indianapolis factory.

**Agent Liable for Contract**—In the case of W. A. Alden, as the Peterson Motor Co., against William Kaiser, the Minnesota supreme court has held that a contract for a retail motor car sales agency and for the future purchase of cars by the agent, whereby a deposit of \$200 was provided for, and its receipt acknowledged, the first \$100 to be applied on the contract for five cars and to be retained by the seller until the last car was shipped under the contract, and the other \$100 to be applied on the first car ordered, and whereby it was agreed that the agent was "to purchase five cars, optional," construed and held not to give the agent the right to forfeit the deposit and terminate the contract, but merely to authorize him to select, at his option, the cars purchased from a list of cars and prices set out in the contract, his obligation to purchase five cars being contractually absolute. The allegations of the complaint and the finding of the court concerning damages held suffi-

## Recent Incorporations

**Akron, O.**—Summitt Automobile Co., capital stock \$10,000; incorporators, E. J. Eblen, J. M. Sauder, F. L. Mott, R. Sauder, A. Eblen.

**Altoona, Pa.**—Mountain City Motor Co.; incorporators, H. L. Murray, C. Olmes, E. S. Forney, J. Gleg, G. A. Klesius.

**Augusta, Me.**—Russell Eureka Carburetor Co., capital stock \$200,000; incorporators, R. S. Buzzell, L. J. Coleman, C. L. Andrews.

**Ayer, Mass.**—Robert Murphy's Sons Co., capital stock \$30,000; incorporators, J. R. Murphy, W. E. Murphy, R. E. Murphy.

**Boston, Mass.**—Curtis Motor Repair Co., capital stock \$2,000; incorporators, G. E. Crampton, A. W. Crampton, R. W. Curtis.

**Boston, Mass.**—F. J. Terrill Motor Co., capital stock \$5,000; incorporators, F. J. Terrill, L. T. Smith.

**Boston, Mass.**—M. B. Motor Co., capital stock \$30,000; incorporators, G. W. Bollinger, E. H. Marsters, C. A. Malley.

**Boston, Mass.**—Lowell Buick Co., capital stock \$15,000; incorporators, F. B. Emerson, M. W. Hale, Jr., D. D. O'Dea.

**Boston, Mass.**—Autocraft Co., capital stock \$75,000; to manufacture and repair motor vehicles; incorporators, C. M. Jones, G. G. Hinsdale, W. E. Duncanson.

**Buffalo, N. Y.**—Ivey Truck Co., capital stock \$10,000; general motor car business; incorporators, C. A. Ivey, A. L. Russling, F. G. Heller.

**Cambridge, Mass.**—Gray & Davis Factory Corp., capital stock \$50,000; to manufacture accessories; incorporators, J. H. Maxwell, H. W. Talpin, W. G. Adams.

**Chattanooga, Tenn.**—Hirsch Motor Car Co., capital stock \$5,000.

**Chicago**—Specialty Sales and Mfg. Co., capital stock \$5,000; to manufacture motor car accessories; incorporator, W. Klein.

**Columbiana, O.**—Columbia Rubber Co., capital stock \$100,000; to manufacture and deal in rubber for tires; incorporators, E. L. Henderson, A. E. Albright, H. J. Richards, J. H. Richards, T. Price.

**Columbus, O.**—F and H Wire Wheel Co., capital stock \$25,000; to manufacture motor car wheels; incorporators, L. A. Frayer, C. G. Howard, W. J. Wissinger.

**Brooksbury, N. Y.**—A. R. Newcombe, capital stock \$5,000; general motor car business; incorporators, A. R. Newcombe, L. P. Newcombe, M. W. Newcombe.

**Lawrence, Mass.**—Archibald Wheel Co., capital stock \$800,000; to manufacture wheels for motor cars; incorporators, F. M. Andrew, E. H. Archibald, F. H. Eaton.

**Madison, Wis.**—Washington Street Garage Co., capital stock \$10,000; incorporators, K. E. Posh, L. R. Larson and others.

**Marion, O.**—Marion Punctureseal Co., capital stock \$5,000; to manufacture and deal in mending material for rubbing tubing; incorporators, S. J. Martin, F. P. Beck, I. C. Millison, J. B. Gunder, C. C. Miller.

**Newark, N. J.**—Smith Motor Car Co., capital stock \$25,000; general motor car business; incorporators, J. L. Smith, L. W. Smith, J. W. Mason.

**New York**—Normal Automobile Station, capital stock \$10,000; to conduct garage; incorporators, J. F. Bokelman, A. Bokelman, E. Ganter, J. Ganter.

**New York**—Motor Coach Co., capital stock \$500,000; incorporators, S. Richeuthal, E. R. Benyunc, H. Miller.

**New York**—Charles E. Hottum, capital stock \$20,000; incorporators, M. J. Hottman, W. H. Coffee.

**New York**—North End Coach and Auto Co., capital stock \$2,000; incorporators, M. Horowitz, A. A. Bertini.

**New York**—G. C. Vaporizer Co. of America, capital stock \$50,000; to manufacture vaporizers for carburetors; incorporators, G. Richards, D. W. Richards, F. Sowers.

**Philadelphia, Pa.**—P and P Auto Transportation Co., capital stock \$70,000; incorporators, W. O. Goddard, F. K. Fairchild, G. A. Logan.

**Raleigh, N. C.**—Citizens' Motor Co., capital stock \$8,800; incorporators, W. D. Adams and others.

**Savannah, Ga.**—Savell Rubber Tire Co., capital stock \$25,000; incorporators, W. B. Savell, W. W. Horndell, C. Savell.

**Springfield, Mass.**—Springfield Buick Co., capital stock \$15,000; to conduct Buick agency; incorporators, C. Nelson, D. B. Roberts, T. F. McLoughlin.

**Steubenville, O.**—National Wave Motor Co., capital stock \$1,000,000; incorporator, J. N. Breneman.

**Stonington, Conn.**—Mystic Auto Station, capital stock \$50,000; incorporators, J. F. Noyes, A. E. Noyes, R. A. Noyes.

**Suffolk, Va.**—Suffolk Garage and Machine Co., capital stock \$15,000; incorporators, B. E. Parker, C. C. Parker, G. L. Bower.

**Toledo, O.**—Stewart Auto Sales Co., capital stock \$10,000; incorporators, J. A. McMichael, L. E. Flory, E. A. Hudson.

**Wilmington, Del.**—Church Motor Car Co., capital stock \$1,000,000; to manufacture and deal in engines; incorporators, H. E. Latter, W. J. Maloney, O. J. Reichard.

cient, after judgment, to sustain an award of the profits which the plaintiff would have made if the defendant had fulfilled his obligation to purchase the five cars as provided in the contract.

**Truck Name Not Changed**—The Kelly-Springfield Motor Truck Co. says: "Since the change of the name of this company to the Kelly-Springfield Motor Truck Co., there appears to be some doubt regarding the name by which the truck itself is to be known. The Kelly truck is manufac-

tured by the Kelly-Springfield Motor Truck Co. There has been no change in the name of the truck, but simply a change in the company's name."

**Splitdorf Branch in Europe**—O. J. Rohde, treasurer and manager of the Splitdorf Electrical Co., of New York, has returned from a trip abroad, where he went in the interest of the parent company to establish a European branch and service station for the convenience of users of Splitdorf ignition. The location decided upon was at 6 City road, Finsbury square, London E. C. Mr. Rohde arranged for the installation of devices for testing and repairing ignition outfits and the carrying of a line of spare parts, magnetos, coils, spark plugs and other products of the Splitdorf Electrical Co. The Splitdorf Electrical Co. is to open a similar branch for the southern territory of this country with headquarters in Atlanta, Ga., within the next 60 days, and shortly after a branch for the Canadian trade with headquarters in Toronto, Canada, to care for customers in those sections.



The Locomobile coupe mounted on a little six chassis is something new. It is adapted from the Locomobile seven-passenger berline and shows a close adherence to the current foreign style, which for this year presents an all-closed car with roof lines unbroken by dormer effects and with no angular breaks at the sides or back. All windows may be readily lowered, giving the advantages of an open car in warm weather, together with the shade essential to comfort.



# The Motor Car Repair Shop

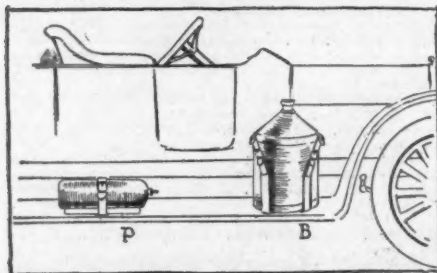


FIG. 1—FOR CARRYING EXTRA FUEL AND GAS

## Securing Extra Fuel and Gas Tanks

ON reliability runs, tours and expeditions through parts of the country where suitable fuel and acetylene gas is liable not to be readily obtainable, it behooves the motorist to have a means of carrying an extra supply in some convenient place about the car.

In Fig. 1 is shown the means employed by one motorist for carrying an extra can of gasoline, and an extra acetylene tank on the running-board of his car. The gasoline can rested in four suitably arranged iron brackets, whose upper ends were bent over and slotted to form a point of attachment for four heavy leather straps. These straps passed through the handles of the can as indicated, and when drawn tight, held the can securely down on the brackets, which in turn were substantially fastened to the running board.

This means of attachment for the extra fuel can, was so generously strong that however great the swinging and jarring of the car over rough roads and around curves, there was little danger of the fastenings giving way, or even coming loose. The latter is an important point. As soon as a fastening of this nature becomes loose, unless immediately refastened it will be but a short time before the whole outfit will be torn to pieces and perhaps beyond repair.

A pacemaking car for a reliability run, once had two extra tires secured to two very stout iron brackets at the back end of the machines. After making a tire change, one of the already inflated extra tires was replaced by a deflated one, and the driver did not take care to secure the straps more tightly than when the inflated tire was in place. This permitted the extra tires to bounce up and away from the rack to only a slight extent, but sufficient to wear one of the straps until it broke. The tires and rims then bounced about more than ever, and as the delay caused by the tire trouble had already made the pacemaker fall behind his schedule, he did not stop, and it was not long before a severe bump in the road caused one of the unusually stout bracket

## Carrying Spare Supplies

arms to give way. This, of course, brings to mind the old adage: "For the want of a nail the shoe was lost, for the want of a shoe the horse was lost, etc."

One always must endeavor to keep down weight on a motor car; therefore one should try to make all accessories as light, but as substantial as possible. If weight is to be sacrificed, however, it is essential that lost motion be eliminated, and that suitable means be provided to conveniently take up any lost motion that might occur owing to wear or stretching of straps.

This applies to all brackets or fastenings of any sort on the car. One must have due regard for the weights of the objects supported and the movements of these weights; so that the stresses and strains to which their fastenings are subject, may be most practicably provided for without damage. There may, therefore, be many better ways of securing an extra gasoline can about a motor car, but this is one good way which has been tried and proven.

## Special Tank Holder

In the same illustration, Fig. 1, is shown how an extra acetylene gas tank was secured to a running board. Two parallel strips of wood were secured to the running board of the car, so that when the tank was placed between them, it would not touch the running board, but would remain suspended about  $\frac{1}{2}$  or  $\frac{1}{4}$ -inch above it. Thus it was jammed securely between the two strips and relative side motion was prevented, even though wear or depression of the wood should occur. To hold the tank down between these strips a very heavy leather strap was employed which passed through slots under the strips of wood, thus it was unnecessary to cut slots in the running board. Of course it would have been better to have passed the straps through slots in the running board, and also to have used a metal strap which would not stretch so readily and is stronger. This, naturally, would be more practical for a permanent attachment. One car in a recent reliability run, had a gas tank, similarly secured, but placed at an angle across the running board. This may have been done either to get a better distribution of the points of attachment, or to bring the connection of the tank closer to the inside of the running board.

## Crankshaft Holder for Repairs

During the time that a repairman is fitting the connecting-rod bearings of a motor to the crankshaft, it is necessary to support the crankshaft in a convenient and substantial position. Some repairmen for the want of a more convenient method

or means, prefer to remove the flywheel from the crankshaft, and then stand the shaft on end on the work bench, securing it in a vertical position by means of bolts, passing through holes in the bench and flange.

This method, while possible with small, short shafts, is quite inconvenient when longer shafts are introduced. Thus, the next best makeshift is employed, which consists in securing the crankshaft by the flange in the jaws of a vice, and resting the opposite end in a wooden or iron support or standard. The latter is a common method and far superior to that of standing the shafts upright on the workbench; but there are cases in which, through some accident the standard has been knocked from under the end of the shaft, allowing the shaft to drop and bend, or the flange has been bent through the sheer weight of the unsupported shaft. Anyone who has had experience with a bent crankshaft will appreciate the seriousness of such an accident. A bent crankshaft is most difficult to straighten. Unless straight it cannot be properly fitted into its bearings. Unless properly fitted in its bearings, the bearings will wear rapidly and give rise to knocking noises when the motor is in operation, and unless the bearings continually are tightened the motor will soon go to pieces. Then again, a shaft that has been very nicely straightened, may resume its bent condition when in service and cause rapid wear of the bearings.

The best means of support for a repair-shop that the writer has yet seen is shown in Fig. 2. There is a slot T behind the flywheel, just like the slot S. The tail of the shaft rests in this, and when it is desired to turn the shaft freely it is necessary only to slip a block of wood between the bottom of the slot and the tail of the shaft which raises the flywheel out of contact with the cradle C in which it rests when it is desired to support the shaft rigidly without turning.

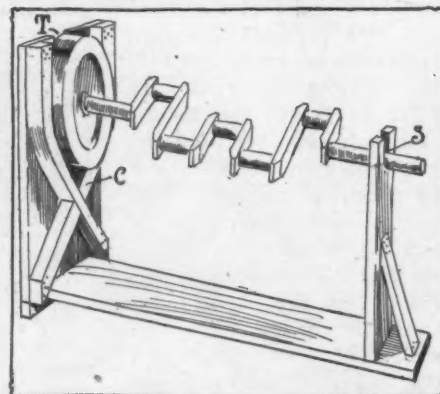


FIG. 2—HANDY CRANKSHAFT HOLDER



# Brief Business Announcements



## Recent Agencies Appointed by Motor Car Manufacturers

### PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Bar Harbor, Me.	O. H. & F. Jellerson	Velle	Janesville, Wis.	Janesville Motor Co.	Overland
Bar Harbor, Me.	O. H. & F. Jellerson	Cadillac	Janesville, Wis.	Janesville Motor Co.	National
Bar Harbor, Me.	O. H. & F. Jellerson	Studebaker	Janesville, Wis.	Janesville Motor Co.	Stutz
Bar Harbor, Me.	W. H. Davis	Overland	Janesville, Wis.	Janesville Motor Co.	Rambler
Bar Harbor, Me.	Fred Sawyer	Metz	Janesville, Wis.	Janesville Motor Co.	Stanley
Bar Harbor, Me.	Fred Sawyer	Cartercar	Janesville, Wis.	Janesville Motor Co.	Cutting
Bath, Me.	Bath Garage Co.	Cutting	Janesville, Wis.	Janesville Motor Co.	Herreshoff
Boston, Mass.	M-B-M Motor Co.	Maxwell	Lebanon, N. H.	Smith Auto Sales Co.	Ford
Boston, Mass.	F. N. Phelps	Baker	Lebanon, N. H.	Smith Auto Sales Co.	Buick
Boston, Mass.	F. K. Patch	Pathfinder	Lebanon, N. H.	Smith Auto Sales Co.	Kissel
Boston, Mass.	Hollander Motor Car Co.	Cartercar	Lewiston, Me.	Androscoquin Motor Co.	Peerless
Boston, Mass.	Alfred Cutler Morse	Mercedes	Lewiston, Me.	Androscoquin Motor Co.	Fiat
Brookline, Mass.	L. A. Vashon	Ford	Lewiston, Me.	Androscoquin Motor Co.	Studebaker
Detroit, Mich.	Rumsey Electric Garage	Ohio	Lewiston, Me.	Androscoquin Motor Co.	Chalmers
Edgerton, Wis.	F. P. Carrier	Imperial	Lewiston, Me.	Androscoquin Motor Co.	Paige-Detroit
Evansville, Wis.	The Durner Co.	Studebaker	LaGrange, Ind.	J. M. Wigton	Cutting
Janesville, Wis.	F. B. Burton	Marathon	Manchester, N. H.	Smith-Ramsey Auto Co.	Overland
Janesville, Wis.	Park Hotel Garage	Michigan	Memphis, Tenn.	Wright Motor Car Co.	Ohio
Janesville, Wis.	Goodman Livery Co.	R-C-H	Plainville, Ct.	F. O. Thompson	Michigan
Janesville, Wis.	R. F. Buggs	Pathfinder	Philadelphia, Pa.	Philadelphia Motor Sales Co.	Auburn
Janesville, Wis.	R. F. Buggs	Regal	St. Louis, Mo.	Ohio Electric Sales Agency	Ohio
Janesville, Wis.	J. H. Burns & Son	Cartercar	St. Paul, Minn.	Nyberg Motor Car Co.	Nyberg
Jefferson, Wis.	Jefferson Auto Co.	Ford	West Cornwall, Ct.	Edward Cartwright	Michigan
Janesville, Wis.	Janesville Motor Co.	Borland	Worcester, Mass.	Stanley Motor Car Co.	Stanley
Janesville, Wis.	Kemerer Garage	Detroit	Worcester, Mass.	J. R. Hawks	Havers

### MOTOR TRUCKS

Boston, Mass.	R. G. Howard	Vulcan	Janesville, Wis.	J. A. Strimple Co.	Chase
Boston, Mass.	G. F. Kexhew	Mercury	Janesville, Wis.	A. A. Russel & Co.	Kissel
Boston, Mass.	Lansden Motor Co.	Lansden	Boston, Mass.	F. R. Parker	Pathfinder
Boston, Mass.	W. A. Magill	Blair	Los Angeles, Cal.	Y. R. Del Valle	Koehler
Boston, Mass.	Thos. B. Jeffery Co.	Jeffery	Southampton, L. I.	J. S. Allen	Koehler
Edgerton, Wis.	F. P. Carrier	Dart	St. Paul, Minn.	E. F. Morgan	Sternberg
Janesville, Wis.	Janesville Motor Co.	Service	Shelby, N. C.	J. Arey	Koehler
Janesville, Wis.	Janesville Motor Co.	Jeffery	Worcester, Mass.	Acme Motor Car Co.	Koehler
Janesville, Wis.	J. H. Burns & Son	Commerce			

**CLEVELAND, O.**—The Quiggle Auto Co., of Cleveland, has reduced its capital stock from \$10,000 to \$2,000.

**Pontiac, Mich.**—W. D. Kelly, who has been with the Oakland Motor Car Co. for the past 4 years is now factory manager.

**St. Paul, Minn.**—C. J. Byrne, formerly of the Western Display Co., has been made manager for the Cartercar company, 352 Minnesota street.

**Seattle, Wash.**—Robert Atkinson, for some time past associated with the J. W. Leavitt & Co. in Portland, has resigned and will act as manager of the Pacific Car Co. in Seattle.

**Indianapolis, Ind.**—Harold D. Bornstein has entered the service of the Premier Motor Car Co. where he has joined the sales department and will assist in the advertising and publicity work.

**Milwaukee, Wis.**—Directors of the Johnson Service Co., Milwaukee, builder of motor trucks and heating appliances, recently declared the usual 8 per cent dividend and re-elected the present officers and directors.

**Milwaukee, Wis.**—Leo Hofmeister, one of the largest dealers in oils, greases, compounds, etc., in Milwaukee, has filed a voluntary petition in bankruptcy. The liabilities are scheduled at \$46,007.29 and the assets at \$36,606.40.

**Manitowoc, Wis.**—The Wisconsin Aluminum Foundry Co. of Manitowoc, Wis., has started work on the new factory building planned some time ago, when the capital stock was increased from \$55,000 to \$110,000. The Citizens Association of Manitowoc donated the site of 5 acres whereupon the foundry plant will be erected.

**Detroit, Mich.**—The Traveler Motor Car Co., recently formed in this city, has purchased a two-story brick building at 1146 Grand River avenue and an adjoining lot with a 40-foot frontage. Plans have been prepared for the erection of a brick structure on the vacant lot and for the remodeling of the present building. It will make the Traveler. Several Detroit business men are

interested in the company as follows: J. P. Lavigne, W. K. McIntyre and F. W. Barstow.

**Portland, Ore.**—H. C. Skinner, from Houston, Tex., is now manager of the Portland branch of the Ford Motor Co.

**Ancka, Minn.**—Frank Merrill, chief engineer for the Veerac Motor Co. since its incorporation, has been made general manager.

**Troy, O.**—Papers have been filed with the secretary of state increasing the capital stock of the Star-Storm Front Co. from \$35,000 to \$100,000.

**Portland, Ore.**—Thomas M. Hart has recently been appointed manager of the Portland branch of the Stewart-Warner speedometer. He formerly was manager for the company in Los Angeles.

**Milwaukee, Wis.**—William Diemann, 725 Greenfield avenue, Milwaukee, has been granted a permit to build a garage and salesroom at that location to cost \$10,000. No agency lines have been decided upon as yet.

**Detroit, Mich.**—Guy Vaughan has tendered his resignation to the General Motors Co. and severed his connection with the Olds Motor Works at Lansing, Mich. He has accepted an executive position with the F. B. Stearns Co., of Cleveland.

**Birmingham, Ala.**—Loveman, Joseph & Loeb have let a contract for the erection of a new garage at Avenue C and Twenty-first street. The building will be the largest structure especially designed for motor cars in Birmingham. The company represents the Chalmers and the Pierce-Arrow.

**Syracuse, N. Y.**—C. Arthur Benjamin, who recently became general sales manager of the Alco, has sold his local business and stock to W. D. Andrews, bicycle and sporting goods dealer, now at 216 East Washington street. Mr. Andrews has formed a new company, capitalized at \$100,000 to continue the business at the same location. Mr. Andrews is president, Ross L. Andrews, treas-

urer and general manager; E. F. Fuller, vice-president, and H. L. Dyer, office manager, will be secretary.

**Detroit, Mich.**—H. G. Harper has been made inspector general of the motor car division of the Studebaker Corp.

**Detroit, Mich.**—The Lewis Spring and Axle Co., Jackson, Mich., announces the appointment of W. H. Cameron as production manager.

**St. Louis, Mo.**—The J. I. Case Co. has opened a salesroom and service station at 5072 Delmar avenue. H. B. Daniels will be in charge of the new quarters.

**Detroit, Mich.**—J. C. Austin, formerly connected with the Regal Motor Car Co. in the capacity of chief engineer, has taken a position as assistant to J. G. Heaslett, chief engineer of the Studebaker Corp.

**Beloit, Wis.**—The Viscosity Oil Co., of Chicago, which is owned principally by the Travers interests at Beloit, Wis., is planning the establishment of a large warehouse and station at Durand, Wis., to supply the northwestern states.

**Detroit, Mich.**—George R. Moran, formerly chief engineer for Barthel, Daly & Miller, and later executive engineer in charge of the Detroit office of the New Departure Mfg. Co., has taken a similar position with the Suspension Roller Bearing Co., Sandusky, O.

**Pittsburgh, Pa.**—The Murwin Gasoline Co. purchased 88 by 100 feet in Grant boulevard, near Finland street, for \$70 a front foot. The motor interests are rapidly acquiring Grant boulevard frontage, this sale being one of the several reported recently in that vicinity.

**New York**—Louis M. Baker has been appointed sales manager for Clarence N. Peacock & Co. Two years ago he established the Baker Rim Co. as eastern distributor for the Universal Rim Co. Mr. Peacock has engaged him to direct the sales of the Amos shock absorbers. Mr. Baker retains his financial interest in the Baker Rim Co. but will devote all his time to the Peacock company's business.





CAT &  
DOG  
MOTOR  
PLUG

# The Motorist's Kindergarten



**EDITOR'S NOTE**—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car. The first article appeared October 10, 1912.

SEVERAL makers have preferred to conduct quantities of oil to the bearings directly. In one such system, Fig. 54, which for years has been used on one of the best-known motor cars, a large oil-reservoir is placed above the cylinders, sufficiently near the exhaust manifold to keep the oil from congealing in cold weather. From this tank, oil flows by gravity through tubes to the crankshaft main-bearings; then, by centrifugal force, through an oil hole in the crank arm, out to the crank pin. Oil flying off the latter takes care of the piston, cam-shaft, etc., and the surplus is returned to the reservoir by a positively-driven gear pump in the lowest part of the crankcase. A glass gauge on the dash shows at all times the height of oil remaining in the reservoir. This system is very simple and reliable; but as the

## Lubricating Systems Part III

spring tension in a by-pass or pressure regulating valve.

In splash systems the continued churning of any dirt collecting in the crankcase may work havoc with the bearings; in these forced-circulation systems, since the flow is from the inside of the bearing outward, the latter is washed clean of all grit and metallic particles. Nor is there any possibility of these foreign bodies entering the circulation again, for in every case the oil is filtered through a fine gauze before it again is pumped to the bearings. To prevent the leakage of oil out the motor ends, the outside main-bearings are provided with oil-retaining rings. Such a de-

vice, Fig. 57, consists essentially of a small, thin disk on the crankshaft, just outside its journal. Centrifugal force causes all the oil that leaks out through the main bearings to fly off this into a cap that returns it to the crankcase.

To recapitulate: Oiling systems divide themselves into three distinct classes. The first system is the most simple. This is the fuel-injection system, wherein the oil is mixed in the correct proportions with the gasoline, being introduced into the cylinder through the carbureter and inlet. The second system is the simple splash type, in which a supply of oil is carried in the crankcase, from which it is fed to the bearings and to the interior of the cylinder by the splashing and churning of the oil by the connecting rods and cranks as they dip into the oil. The third is the simple pressure system, in which there is no splash, the oil being retained in a reservoir below the crankcase, and separate from it. A force pump impels the oil from this reservoir to each bearing through closed tubes, from whence it is led through a drilled crankshaft to the crank bearings and up through the connecting rod to the wrist pin.

A combination of this system and the splash system is embodied in what is termed the splash-pressure type. In this the oil is retained in a reservoir below the crankcase, and feeds through a pump to the bearings, and sometimes through a drilled crankshaft, under pressure, the overflow draining into the crankcase, where it is conveyed to the cylinders and wrist pins by splash.

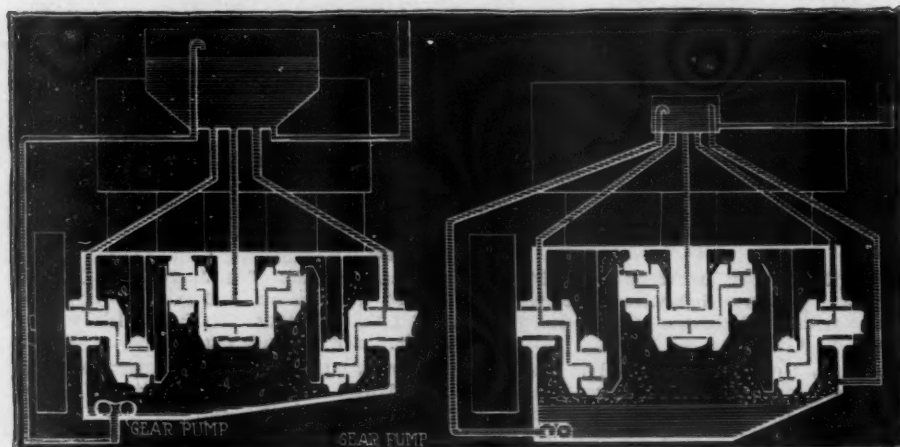


FIG. 54—DIRECT GRAVITY FEED TO ALL BEARINGS CIRCULATED BY GEAR PUMP

FIG. 55—GRAVITY FEED TO ALL BEARINGS WITH CRANKCASE RESERVOIR

accessibility and general appearance of the motor are not improved by the prominent position of such a large oil reservoir, a modification, Fig. 55, is employed.

In this, the crankcase is deepened to form the main oil reservoir, and by providing a pump connected to, and an overflow from, the small gravity tank, the latter is always kept full. If the gravity tank is omitted, and the pump allowed to force oil directly into a hollow crankshaft, and thence to all bearings, we have an improved form of the De Dion pressure system, Fig. 56.

By running a tube along the connecting rod from the big-end bearing into the wrist-pin bearing, the latter will be flooded by virtue of the oil-pressure in the hollow crankshaft. Oil circulation may be maintained at any desired pressure, usually several pounds per square inch by altering the

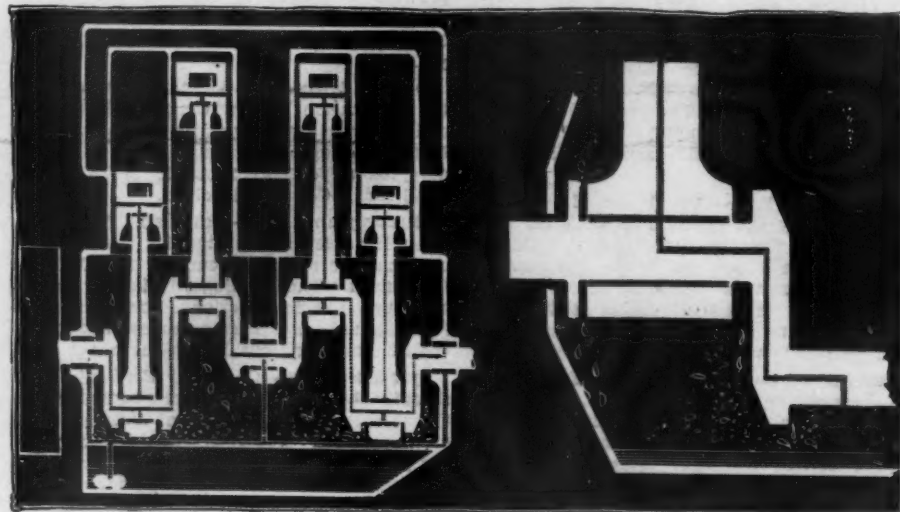


FIG. 56—DIRECT PRESSURE SYSTEM PUMP FORCES OIL INTO CRANKSHAFT

FIG. 57—METHOD OF PREVENTING LEAKAGE AT MAIN BEARINGS

# STROMBERG

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**There are more Strombergs on high priced cars than any other carburetor on the market**

The Stromberg Carburetor is probably the most scientifically developed and most highly perfected economy apparatus of the modern automobile.

The Stromberg gets more out of a gallon of gasoline (of any grade).

The Stromberg is designed to meet, with the utmost economy, present day conditions—in any part of the world. It can be adjusted to any climate.

You, who are about to buy a motor car, or you who own a car, equipped with a carburetor, which may have been right for conditions when that car was new, can have no possible conception of the added efficiency, sweet running qualities, easy control and economic consumption of gasoline made possible by the installation of a Stromberg carburetor.

Study the specifications of the car you are considering. Look under "Carburetor." See if Stromberg is listed. In most cases it is, but if it isn't, insist on a Stromberg, and see that your request is complied with.

It will pay and interest you to read our book "Motor Troubles." It is also instructive and —gratis. Drop us a line and we will mail you a copy.

**Stromberg Motor Devices Company**

**54 East 25th St., Chicago, Illinois**

**Branches**

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Indianapolis

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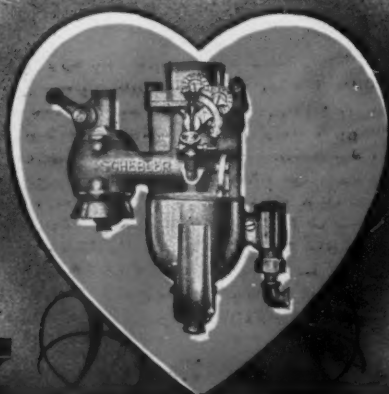
Pacific Coast Distributors: Chanslor & Lyon Co., Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle  
Canadian Distributors: Russell Motor Car Company, Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver





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Australia

# Action

IN the face of any danger it is *action* that saves life and limb.

The Klaxon gets action—*always*.

The bulb horn can not. *Often it is not even heard.*

Horns of soft and soothing sound can not. They *deceive* as to the *distance away, direction, and intent* of an approaching car.

The time is here when the signal that saves life and limb *must* be used—when the law that demands an “adequate” signal, must and *will* be construed for what it means and intends.

**Already** the Klaxon is the choice of more than 150,000 motorists and the regular equipment of every high-grade car made in America—*except only one or two*. Check over this list of *Klaxonized* cars:

A. E. C.	Lozier
Alco	Marmon
American	Matheson
Armleder	Metallurgique
Autocar	Multiplex
H. H. Babcock	National
Balley Electric	Nyberg
Benz	Oakland
Borland Electric	Oldsmobile
Broc Electric	Orson
Buffalo Electric Road-	Packard (Special)
ster	Pope Hartford
Charon (European)	Pierce-Arrow
Chicago Electric	Pratt
Church-Field Electric	Schneider (Europ'n)
Cole (Special)	S. G. V.
Columbia	Simplex
Croxton	Staver
Davis	Stearns
F. I. A. T.	Sternberg
Flanders	Stevens-Duryea
Hudson (Special)	Stoddard-Dayton
King	Touraine
Knickerbocker	Guy Vaughn
Knox	Walker Electric
Lancia (European)	Ward
Locomobile	White

## A Klaxonized Car is a Legalized Car



KLAXONET

Lovell-McConnell Mfg Company Newark, N.J., U.S.A.

# KLAXON

*"The Public Safety Signal"*



KLAXON

When Writing to Advertisers, Please Mention Motor Age



Stock  
Champion*National*International  
Champion

## For Conservative People

—who want the best, who will pay only a price commensurate with quality—this is the car of reliability, safety and luxury.

"Mother, this is the car for you and the family. It's dependable, safe, easy to control, simple to run, and comfortable. It's a car we'll be proud to be seen in. It's a car I'll feel satisfied to have you or the young folks run, because it's really a 'button car.'"



### The National is a "Button Car" that appeals to a woman

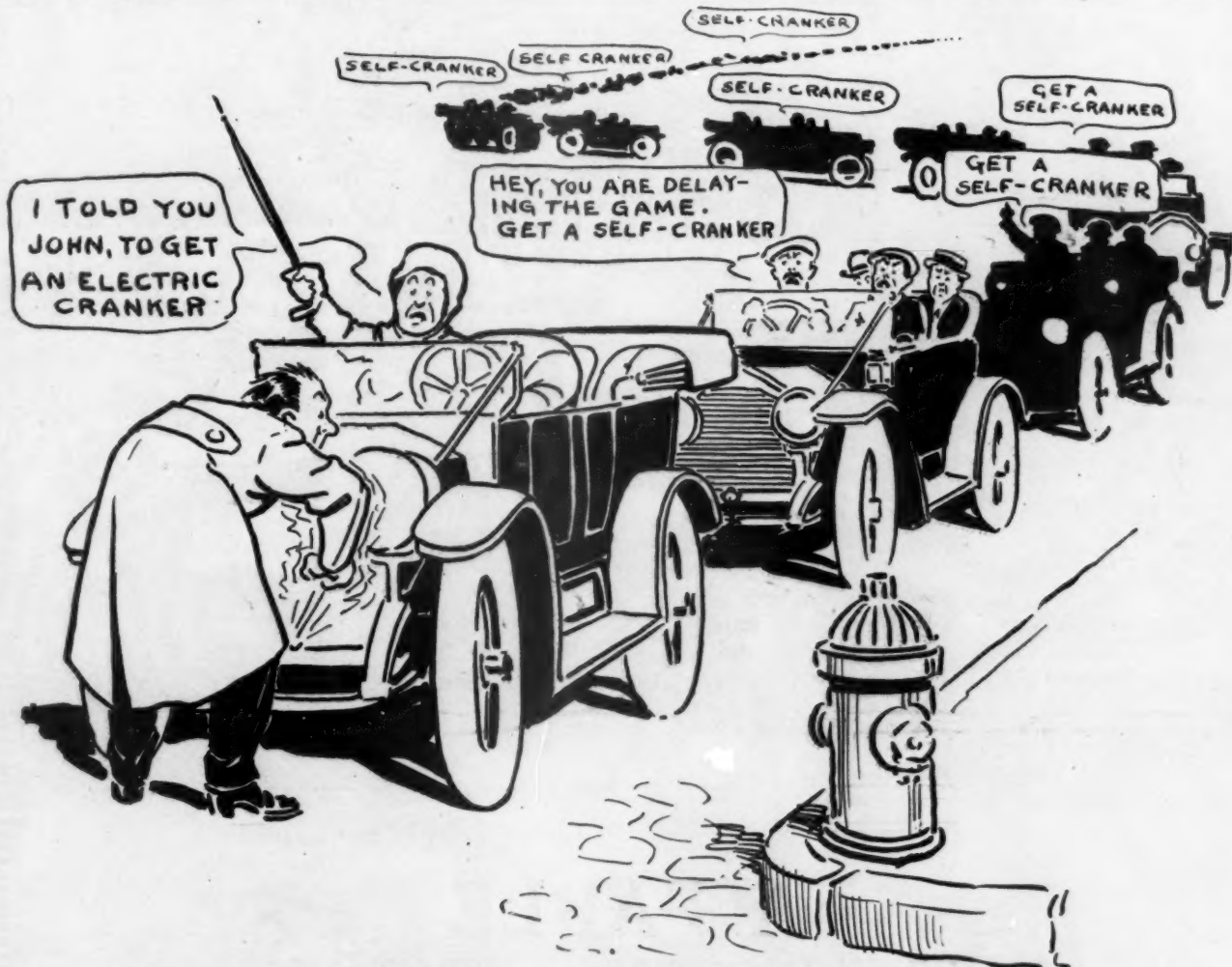
She steps directly from her home into her luxurious National. She touches one button and starts the motor. She touches another button for the electric lights. She has immediate, quick, convenient control of the entire car. She goes at will, in comfort, safety and privacy, shopping, calling, to the theatre, anywhere. She has splendid reserve power and perfect mechanical construction at her command.

Electric Starter,      Electric Lights,      Left Side Drive,      Center Control

WRITE FOR CATALOG

Five Models, \$2750 to \$3400

National Motor Vehicle Co., Indianapolis, Indiana



## Don't Delay the Procession

There's nothing much more annoying than to be the **one man** to delay the whole bunch; the **one man** whose engine stalls and refuses to start; the **one man** who gets—and deserves—the ridicule and abuse of all the rest, that takes their dust the balance of the trip. Will you continue being the **one man**? Or will you have your new car Electrically equipped as all the others are doing?

### AN ELECTRIC CRANKER GETS YOU AWAY QUICK

No matter where you are or what the weather, just keep your seat—don't worry—you're off when you want to go, instantly, surely, if your Storage Battery, the heart of every Electric Cranking System, is an



## STORAGE BATTERY

*Write us for full information*

**Willard Storage Battery Co.**  
**CLEVELAND, OHIO**

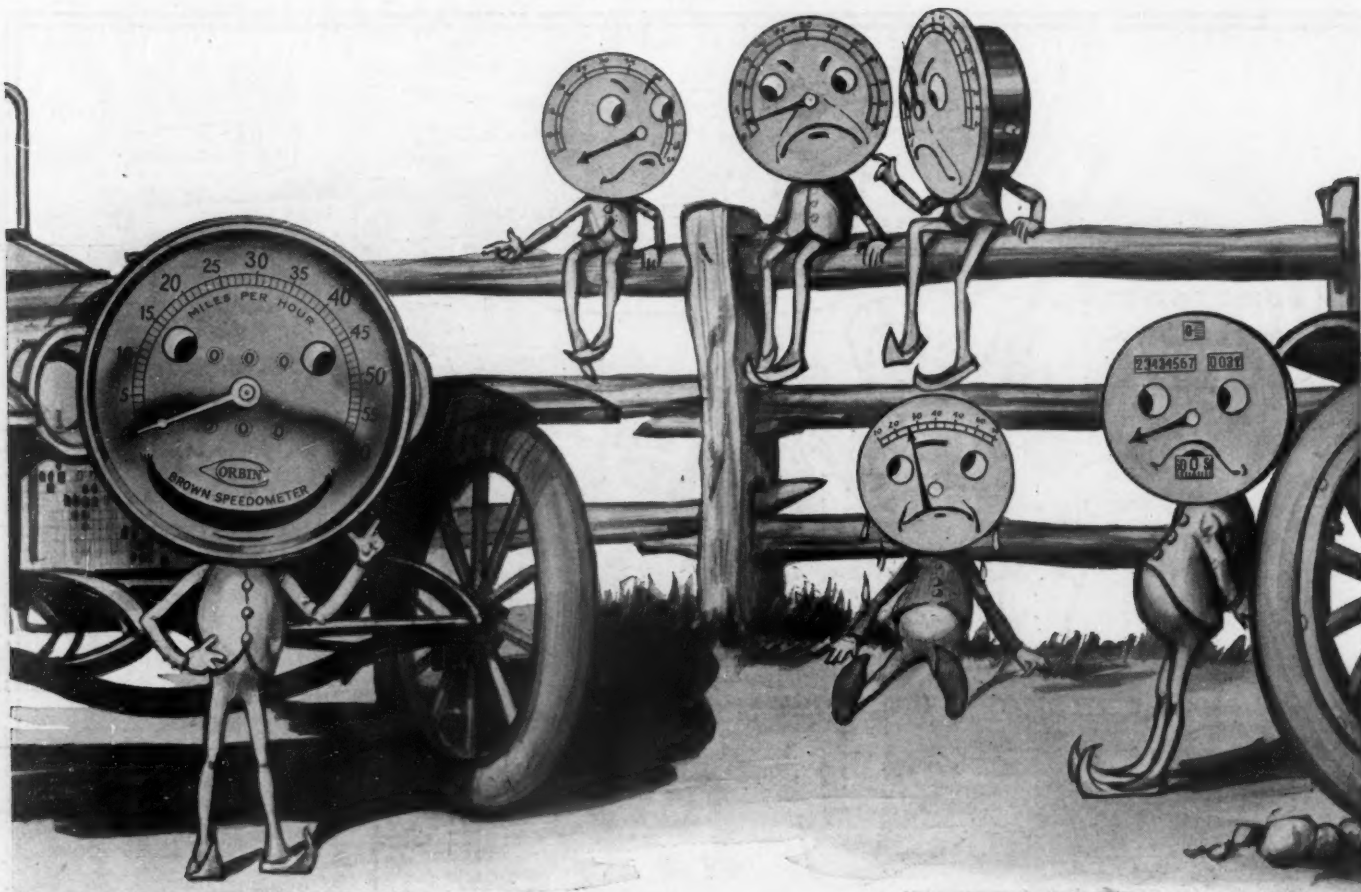
New York Branch: 136 W. 52d St.  
Detroit Branch: 1191 Woodward Ave.

Chicago Branch: 2241 Michigan Ave.  
San Francisco Branch: 243 Monadnock Bldg.

*Depots in all Principal Cities in the United States, Canada and Mexico*

*When Writing to Advertisers, Please Mention Motor Age.*





## A FABLE WHEN THE SPEEDOMETERS TALK

The sun beat down on the automobiles and an odor of scorched leather and hot oil made the heavy air uncomfortable. The speedometers huddled gratefully in the shadows cast by their dash-boards.

"Holy Odometer, ain't it hot," gasped one. "Days like this make my head ache so that I ain't fit for nothin' but the scrap heap."

"I feel it, too," complained another of an academic type. "The torridity of summer and frigidty of winter render me unable to carry out my work correctly—the elements greatly interfere with my accuracy."

"Ain't it so, now?" moodily quoth a fat speedometer to the company at large. "Chills in the winter, hay fever in the summer and if they don't stop sticking these new-fangled contraptions in my lap, I'll eat my dial if I don't have apoplexy."

"Me, too," piped a little, unhealthy-looking speedometer. "I can't stand the cold and the heat positively ruins my disposition, but these new electrical devices send such pains and daggers through my sides that I'm not any good at all, I'm not."

"Well, old high brow, what's your complaint?" testily asked a weather-beaten party of his neighbor.

"Me? No complaint at all," the other smiled. "I have nothing to complain about, but I see where you have. It's not your fault, though—blame your manufacturers. They made you on the magnetic principle and now you've just got to suffer for it. My principle is the centrifugal and the nature of my construction is such that external influences, which make you all so unhappy and unable to correctly perform your proper functions, leave me entirely unaffected."

"I told you so!" snapped an irritable member. "Gosh darn it, I knew I was made wrong from the start," and all the speedometers groaned.

### —: MORAL :—

The simplicity of the centrifugal principle—the principle that has stood the most rigorous tests, the principle used on all engines—is the principle that stands for all that is best and efficient in speedometer construction.

THE AMERICAN HARDWARE CORPORATION  
**THE CORBIN SCREW DIVISION**  
209 High Street, New Britain, Conn.

Branches: New York Chicago Philadelphia

MAKERS OF THE FAMOUS CORBIN COASTER BRAKES FOR BICYCLES AND MOTORCYCLES

NO  
MOVING  
PARTS

SELF  
ADJUSTING

# HOLLEY

## CARBURETOR

### Best I Can Buy

Guaranteed to give not less than 15 miles per gallon on a 6-cylinder, of not more than 4" bore by 5" stroke when used over ordinary roads at ordinary speeds.

Over one half of the gasoline cars manufactured in this country during 1913 will be equipped with the Holley Carburetor.

**HOLLEY BROTHERS COMPANY**  
Detroit, Michigan



Holley Carburetors are carried in stock at the following addresses:

**CHAS. E. MILLER** HOME OFFICE: 97-103 Reade St. and 121 Chambers St., New York

#### BRANCHES

**New York City**  
934 Eighth Avenue  
Between 54th and 55th Sts.

**New York City**  
2782 Broadway  
Bet. 107th and 108th Sts.

**Brooklyn, N. Y.**  
1421 Bedford Avenue

**Buffalo, N. Y.**

834 Main Street

**Albany, N. Y.**

135 Central Avenue

**Boston, Mass.**

292-304 Columbus Avenue

**Springfield, Mass.**

Bridge and Dwight Streets

**Hartford, Conn.**

374 Trumbull Street

**Detroit, Mich.**

237-239 Jefferson Avenue

**Cleveland, Ohio.**

1529 Euclid Avenue

**Philadelphia, Pa.**

313 North Broad Street

**Atlanta, Ga.**

66 Edgewood Avenue

**New Orleans, La.**

601-603 Baronne Street

**Newark, N. J.**

374 Halsey Street

**FOREIGN BRANCH: Holley Bros. Co., Coventry, England**

When Writing to Advertisers, Please Mention Motor Age.



# Warner

## AUTO-METER

(MAGNETIC PRINCIPLE)

### The Survival of the Fittest

The Warner Auto-Meter (Magnetic Principle) is in keeping with all of the improvements of the modern automobile. The electric starter took the place of the old crank; the electric signal took the place of the old bulb horn; the electric dynamo has done away with changing of batteries; electric lights took the place of the old gas lamps *and the magnetic speedometer has made obsolete all of the old mechanical speedometers.*

Today 216 out of 220 automobile manufacturers use the magnetic speedometer—like the Warner—exclusively.

Practically every high priced automobile is now equipped with a Warner Auto-Meter.

More need hardly be said.

**The Warner Auto-Meter Factory, Dept. 1  
Beloit, Wisconsin**

*Service Stations in all principal cities all over the world*



Model O-2  
Price \$145

When Writing to Advertisers, Please Mention Motor Age.

## Smart!!

Attention to details—finish—that's the secret of smartness in a car—the tires count.

Trim looking tires add greatly to the appearance of any car—shabby tires detract just as much from the smartness of a new one. Shabby looking tires aren't necessary; Tirenew keeps tires looking like new, and more—it waterproofs and protects them from decay; used in conjunction with Narco Tire Cut Filler adds 30 per cent to tire life.

# TIRENEW

TRADE MARK

## Prevents Tire Decay

a liquid, unvulcanized, rubber compound with a base of pure gum. It puts a protecting coat on the tire which will not crack, rub or wash off. Gets down into the cuts and cracks and thoroughly waterproofs the fabric—protects and preserves the tire from the injurious effects of light, air, oil and moisture.

## Makes Tires Look Like New

### Garage Tirenewing Stations

Almost every automobile repair shop or garage is a Tirenewing Station, where for a small additional charge you can have your tires given a weekly coat of Tirenew. If your garage does not have this service they will supply it at your request.

*There are imitations which paint but don't protect—insist on Tirenew.*

**Your Dealer Sells It—**  
if he can't supply you, we will.

**National Rubber Co.**

4411 Papin St.,  
St. Louis, Mo.



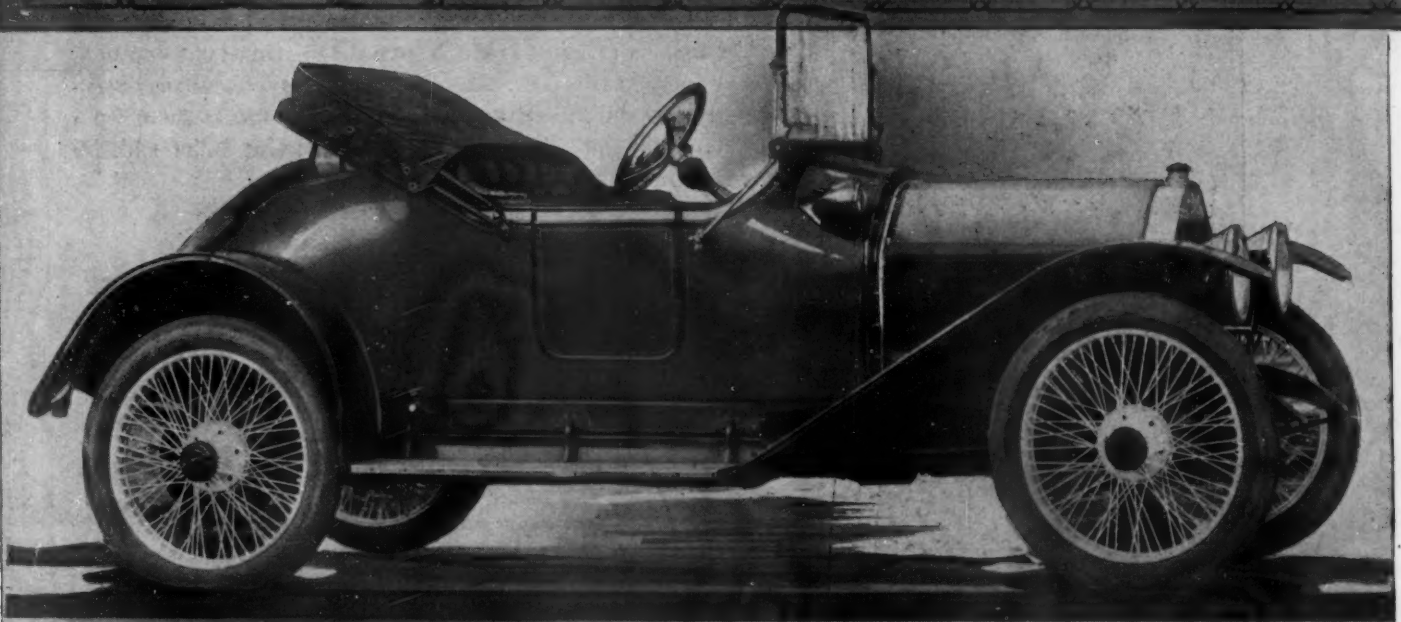
### TIRE CUT FILLER

**The Motorists Self-Vulcanizer**  
Fills the cuts and holes, solidifies quickly and becomes like a part of the tire. Easy to use—clean cut, fill with Narco T. C. F., allow to stand over night; result—a new tire. \$1.00 the tube—anywhere.





# McCUE WIRE WHEELS



**W**IRE WHEELS---the last and most important wood replacement, making the car what it should be---a creation of metal throughout!

Europe grasped the wire wheel idea and adopted it before it had secured even a foothold in America, and European car builders make mighty few mistakes.

Now the wire wheel has captured this country and its adoption by American car manufacturers is increasing with marvelous rapidity.

The reasons are obvious.

McCue wire wheels acknowledged leaders in the American industry are strong. They are practically indestructible, surviving shocks that would prove instantly fatal to wooden wheels.

Sudden changes of heat, cold and moisture cannot warp, crack or otherwise depreciate them. Steel is steel when wood has outlived its usefulness.

*As tire economizers they offer the owner a value too great to be overlooked, and in this, Mr. Dealer, lies the most powerful sales appeal you can make---the appeal to the buyer's sense of economy.*

# AND AXLES



McCue design gives extreme lightness at the rim—the weight at the hub. This reduces the “pound” or effect on the tire to a minimum.—

And it is a far cry from the wooden periphery, or the wire wheel with detachable rim that pounds the life out of the tire in short order, decreasing its life as high as fifty per cent.

When you specify **McCUE WIRE WHEELS** on the cars you sell, then you specify strength, lightness, indestructibility and most important *tire economy*.

It is clearly up to you to get into the wire wheel class—*right now*. Your trade wants wire wheels. Put it up to the men who make the cars.

## Ⓢ Standard Company Spokes Ⓢ

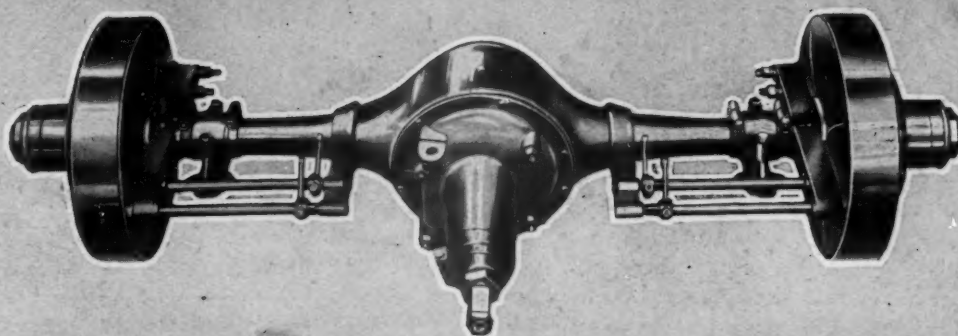
Are used exclusively in the construction of **McCUE WIRE WHEELS**. Made from wire of the same standard set by the Coventry, (England) Swaging Concern. They offer tremendous torsional and tensional strength, combined with extreme bending quality made possible only by the special drawn carbon steel used in their construction.

## McCue Axles

Represent the best in axle making, material, design and workmanship. All combine to give maximum service under all conditions of road shock, side thrust and load.

If your customers want wire wheels you write to the manufacturer for inner hubs and wire wheels to go on the particular model to be so equipped. We are situated so that we can meet this demand for the manufacturer.

## THE McCUE COMPANY, Buffalo, N. Y.





# INTERLOCKS

## Double Your Mileage

### Prevent Blow-Outs and Punctures Save Half Your Tire Expense

If you really believed this you would order a set of Interlocks for your car at once. We can prove our statements if you will give us the opportunity. Thousands of car owners are discarding inner shoes, reliners, fillers, extra treads and other makeshifts for Interlock Inner Tires with the most satisfactory results. A set of new tires equipped with Interlocks will carry your car an entire season without tire trouble. That's a big statement, but we can prove it.

**What Interlocks Are** Interlock Inner Tires are complete endless inner tires (not inner shoes) quickly and easily placed between the outer casing and the inner tube. They strengthen the outer case and protect the inner tube from punctures. The patented Interlock Flaps lock the Interlock securely making it an integral part of the whole tire that flexes perfectly and cannot chafe, creep or heat. Interlock Inner Tires will hold even if the outer casing is broken, and can be used in old or new tires. They double the mileage of new tires and add 1,000 to 5,000 extra miles to old ones. Interlocks have a fine gray rubber finish, are smooth outside and inside and have no troublesome ends, joints or edges to cement. Interlocks do not affect the resilience of your tires—are easy to insert and can easily be removed from one tire and replaced in another.

**Proved Best by Road Tests** Interlock Inner Tires are the only tire reinforcement that has stood the exacting test of hard road work. Eight tires equipped with Interlocks have made over 7,000 miles each, a total of 56,000 miles, without a blow-out or any tire trouble. Interlocks used in tires that have gone 10,000 miles with the outer casings worn clear through have kept up with fast cars equipped with new tires and carrying extra tires. Interlocks have made a 4,500 mile cross country run—the last 1,000 miles over 20 mountain ranges without a blow-out or even carrying an extra tire. In the Four States Run Interlocks stood the test of hard fast road work under the critical observation of tire experts, without tire trouble. These and other hard public tests have proved the efficiency of Interlock Inner Tires beyond question.

### 90% Of All Tires Are Scrapped Before The Rubber Tread is Half Worn Out

because the fabric is not strong enough to resist hard road work, resulting in blow-outs, punctures, rim cuts, etc. The liberal excess fabric strength of tires equipped with Interlocks prevents blow-outs, punctures, etc., gives extreme long mileage, safety, and that freedom from tire trouble which every car owner desires.

### Are You Open to Conviction?

Send us your address on a post card and let us mail you our booklets, data and testimonials of users which are very convincing. Interlocks are sold by the best dealers everywhere. Ask your dealer about them.

**Double Fabric Tire Co.**  
128 W. 9th Street. Auburn, Ind.



# NEWTONE SUPERIOR

## \$10 ————— \$10

### The Best Motor Horn to Buy at the Lowest Price

We are selling an average of over 2300 Newtone horns each week from orders already placed and contracts pending we will make more.

### Over 1,000,000 Newtone Horns Sold

This is a record never before equalled in the history of the electric warning signal and clearly demonstrates the unquestionable superiority of Newtone products.

### Why Buy the Best Horn for the Least Money

We are the largest Auto Horn Makers in the World.

We sell over 75 per cent of the trade with different types of horns.

Our factory is the largest—our Machinery of the best.

Our factory in every way are superior.

In the past ten years we have made and sold over one million of the standard and fifty thousand of different types and sizes.

### Every Newtone makes for EFFICIENCY and ECONOMY



TORPEDO TYPE

and

Type M

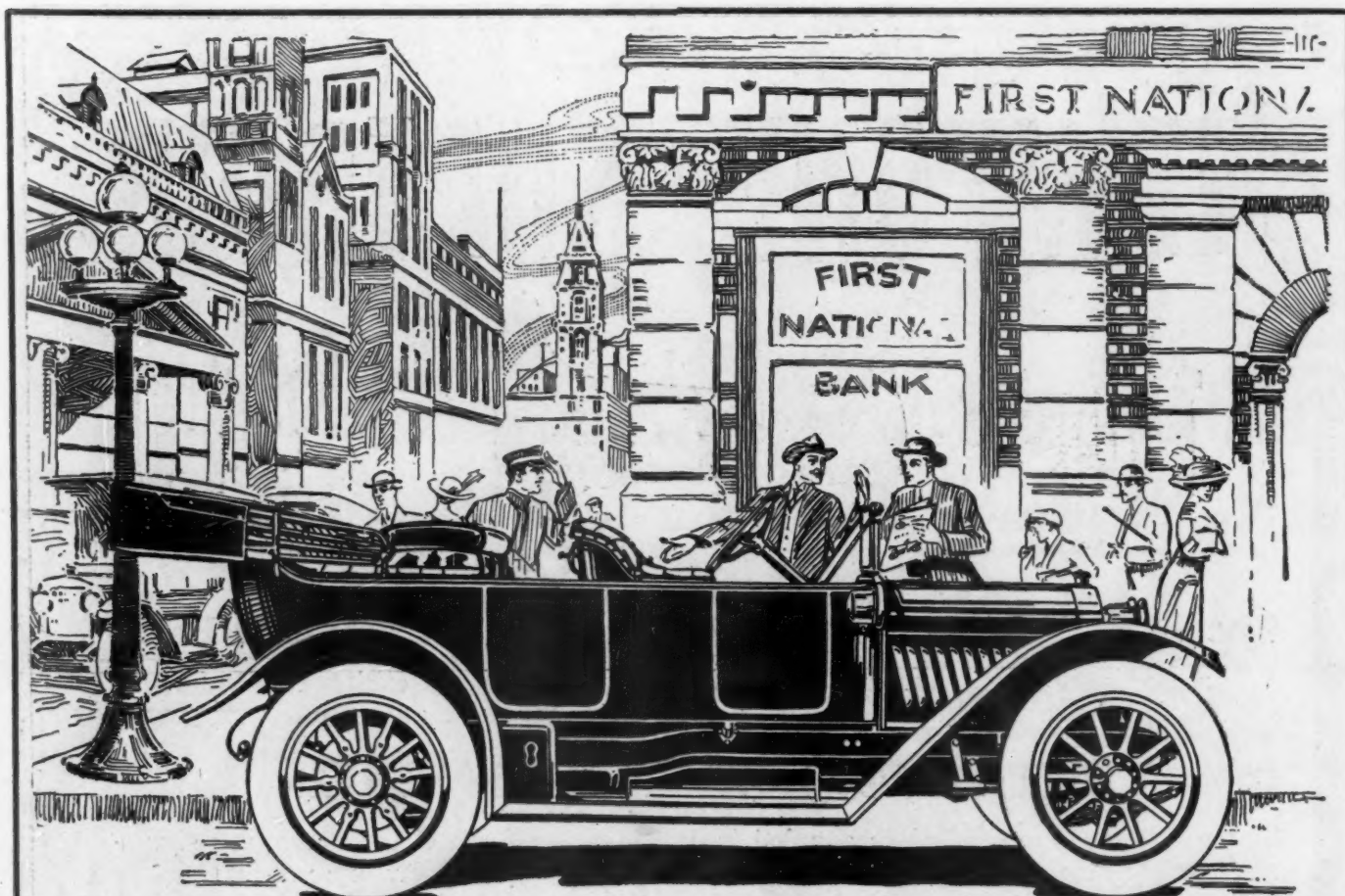
Price \$20

Price and Quality Rule

Write for Catalogue

**Automotive Supply Manufacturing Company**  
220 Tenth Avenue, BROOKLYN, N. Y.





### "MY NEXT CAR WILL BE ANOTHER ABBOTT-DETROIT"

That is the unanimous declaration of the owners of America's favorite car. The majority of these motorists had previously owned cars before purchasing an Abbott-Detroit. They were well versed in automobiles and knew what they were about when they decided that their next car would be an Abbott-Detroit.

No such person has ever had occasion for regret in having made such a change. The Abbott-Detroit is found to be absolutely dependable and in every way a high-class car. It is the car tried and true.

But there is possibly a still greater and more important truth that will interest you. It is this: That once having joined our ranks, our owners always continue to buy Abbott-Detroits. Hundreds of financially able people who insist on having the latest and best in automobiles, buy new Abbott-Detroit models each succeeding season. They know that the Abbott-Detroit is the **up-to-the-minute** car. Others drive their cars year after year without repair expense and will ultimately buy another Abbott-Detroit.

Could you ask for better proof and evidence of quality of a car than that? Is it not a strong point of merit in this day of keen competition that we are not only able to hold our trade without effort

but find thousands of other critical buyers ordering Abbott-Detroits?

While many motor cars may be made to look beautiful, there is a more vital consideration than appearance alone. A fine looking piano does not always insure good musical qualities. While "good looks" are important, they are by no means the weightier consideration with the careful buyer. The name of the instrument is the point that usually decides. But the wise builder gives both beauty in finish and musical qualities.

So with the automobile. Lasting popularity is only gained by giving and maintaining a high standard of quality. An expert carriage-maker might build a beautiful automobile body. But who would want a handsome body on a worthless chassis? The Abbott-Detroit has combined perfection of mechanical qualities with beauty of design and every other desirable feature more successfully than has any other manufacturer. Nothing is slighted. Our aim has always been to build the most perfect car. In this we have succeeded.

We offer the Abbott-Detroit to those desiring the maximum car.

#### A FEW OF THE MANY SUPERIOR FEATURES

Continental Motors, Electric Self-Starter, Underslung Spring Construction, Electric Lights, Oversize No-Rim-Cut Goodyear Tires, Booth Demountable Rims, Heavy Artillery Wheels, High-Grade, hand-buffed Leather Upholstery, 12-inch Turkish Roll Cushions, Rain Vision and Ventilating Windshield, Piano Finish, Inside Control, Dash and Extension Lights, Dual Ignition System, including Magneto, Timken Roller and Schafer Annular Bearings, Spicer Universal Joints, Finest Trimmings, Etc., Etc.

#### MODELS AND PRICES

34-40 3-Passenger Roadster, 116-inch wheelbase.....	\$1700	44-50 7-Passenger Touring Car, 121-inch wheelbase.....	\$2000
34-40 5-Passenger Touring Car, 116-inch wheelbase.....	\$1700	44-50 Battleship Roadster, 121-inch wheelbase.....	\$2150
34-40 3-Passenger Colonial Coupe, 116-inch wheelbase.....	\$2000	44-50 7-Passenger Limousine, 121-inch wheelbase.....	\$3050
44-50 5-Passenger Demi-Tonneau, 121-inch wheelbase.....	\$1975	Top, Windshield and Speedometer \$100 Extra	

**Abbott Motor Company, 606 Waterloo St., Detroit, Mich.**

*Blows at the Slightest  
Compression*

*Adjusting  
Device*



## The Steamboat Whistle for the Automobile

**No Squawk! No Screech!! No Buzz!!!**

**But a Full Round Melodious Steamboat Tone**

That's the Big Four Exhaust Horn—the signal that *meets all the requirements* of the *most exacting* motorist. The Big Four Exhaust Horn is the *only adjustable, guaranteed non-cloggable* exhaust horn on the market. It gives a uniformly sweet *full tone*, without chug or screech, no matter what the speed of the motor—

AND IT COSTS YOU NOTHING TO BLOW IT.

# Big 4 EXHAUST HORN

## ADJUSTABLE · CANNOT CLOG

Constructed of finest materials, nicked brass and aluminum; nothing to get out of order and is sold on an unqualified guarantee of permanent satisfaction. Attaches back of the muffler—costs nothing to attach. Sells at a reasonable price. Made in three sizes:

Big 4, No. 1, 19 inches, \$12.00  
Big 4, No. 2, 16 inches, 11.00  
Big 4, No. 3, 13 inches, 10.00

**Car Owners.** Inquire at your dealers'—if he can't supply you write us, giving make of your car, and name of nearest dealer. We'll see that you're supplied.

**DEALERS! Get Our Guaranteed Sales Plan**

The greatest proposition ever made to dealers. We guarantee to sell the horns for you—we furnish the prospects, pay for your advertising, help you close the sales. The Big Four Agency means big money for you. Send the coupon now, TODAY, before you forget it.

**Big Four Horn Co.**  
Dept. 124 WATSEKA, ILL.

**Live  
Salesmen  
Wanted  
Everywhere**  
Exclusive  
Territory

**Big Four Horn Co.**

Dept. 124 Watseka, Ill.

Send me full particulars of Guaranteed Sales Proposition.

Name.....

City.....

Street.....

State.....



# REMY

## Electric Company

(With a country-wide system of branches and service stations)

Designers and Builders  
of  
High Grade  
Starting and Lighting  
Equipment For Motor Cars  
(Sold to car makers only)

Makers of magnetos for fourteen years

Our country-wide service is available to  
each user of Remy equipment

Write us to-day about our Magneto exchange offer. We will  
make a liberal allowance for old equipment (any make)

# REMY

Pioneer Manufacturers of Ignition Equipment

Factory and General Offices:  
Anderson, Indiana



**Increase  
Power**

**PATENTED**  
**How much gas  
did you waste last  
year?**

**Decrease  
Carbonization**

Do you realize that old-style, leaky piston rings waste gallons and gallons of gasoline in a year? They do! You pay for the gasoline they waste—and get no good from it. All that comes to you is a big loss in power—a big loss in cold dollars and cents.

You would save that power—save that expense—if you could, wouldn't you? You can do what others are doing. Thousands of motorists are getting from 10% to 20% more power out of their motors than before—are cutting big slices off their fuel bills by using—

## **Leak-Proof Piston Rings**

If the high cost of gasoline has hit you in the pocket-book—if lost compression has been draining power from your motor—fit your engine with piston rings that make every drop of fuel give an account of itself—**LEAK-PROOF** Piston Rings. It costs more right along to use ordinary piston rings than it does to purchase **LEAK-PROOF** Rings once. Get yours from your dealer today. **LEAK-PROOF** Rings are made in all sizes, for all requirements. They may be obtained from any supply house, garage or repair shop, or write our nearest branch office.

**McQUAY-NORRIS MFG. CO., 1312 Chestnut St., St. Louis, Mo.**

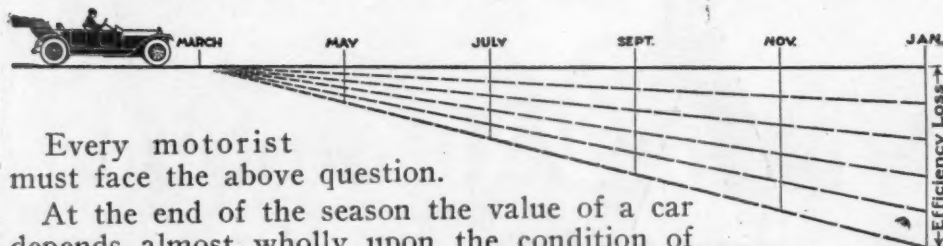
**BRANCH OFFICES AND MANAGERS**

NEW YORK, N. Y.	H. P. MARSH, 53 Lincoln Sq. Court, 64th and Broadway
CHICAGO, ILL.	H. G. PARO, Suite 39, Merchants' Building, 106 North La Salle Street
PITTSBURGH, PA.	J. W. McKEEN, 7620 Tloga Street
SAN FRANCISCO, CALIF.	WM. B. GODFREY, 268 Market Street
KANSAS CITY, MO.	CHAS. H. ECKHARD, 3123 Michigan Avenue
LOS ANGELES, CALIF.	W. H. STEELE, 822 Central Building, 6th and Main Streets
FORT WORTH, TEXAS	E. S. MOBERLY, 108 Bryan Street

*When Writing to Advertisers, Please Mention Motor Age.*



# "What will the year 1913 do to your car?"



Every motorist must face the above question.

At the end of the season the value of a car depends almost wholly upon the condition of its motor.

That depends mainly on the lubricating oil that has been used.

Motor-wear is not accidental. It results from friction.

*Excessive friction is bound to follow the use of an oil whose "body" is unsuited to the feed system, or whose lubricating qualities cannot properly withstand the demands of service.*

Common results are:

- (1) Undue loss of power.
- (2) Unnecessary repair troubles.
- (3) An excess consumption of fuel.
- (4) An excess consumption of lubricating oil.

To avoid these losses, the motor must be supplied with:

- (1) An oil that will retain efficient lubricating qualities *under the heat of service.*
- (2) An oil that will wear well in use.
- (3) Oil of a "body" that will properly feed to the various friction points.

Motors differ.

No short-cut method can determine the oil that best meets certain feed requirements.

The construction of the motor must be analyzed and carefully considered.

The piston clearance must be known; the fit of the piston-rings into their recesses; the length of the crank shaft and connecting-rod bearings; the feed system; the length of the vacuum period while intake and exhaust valves are both closed.

We have undertaken this serious problem with the thoroughness that has established our standing in the general lubricating field.

To arrive at correct automobile lubrication we have done what must be done. Every year we carefully analyze the motor of each make of automobile.

Based on this motor-analysis, and on practical experience, we specify in a lubricating chart (printed in part on this page) the grade of Gargoyle Mobiloil best suited to each motor.

The superior efficiency of the oils specified has been thoroughly proven by practical tests. In sheer lubricating quality, we can safely say that they stand alone.

So far as correct lubrication can assure it, the grade of Gargoyle Mobiloil specified for each car assures:

- (1) The greatest horsepower efficiency.

- (2) The smoothest operation.

- (3) The fewest repair troubles.

- (4) The lowest operating cost per mile.

- (5) The longest life to the motor.

- (6) The greatest second-hand value.

Throughout the world you will find that the authoritative leadership of the Vacuum Oil Company in matters of lubrication is unquestioned.

The lubricating chart on this page represents our professional advice.

If the motorist is supplied with an oil of less-correct "body" or of lower lubricating efficiency than that specified, his motor faces unnecessary friction and ultimate serious damage.

A booklet, containing our complete lubricating chart and points on lubrication, will be mailed you on request.

The various grades of Gargoyle Mobiloil, refined and filtered to remove free carbon, are:

Gargoyle Mobiloil "A"  
Gargoyle Mobiloil "B"  
Gargoyle Mobiloil "D"  
Gargoyle Mobiloil "E"  
Gargoyle Mobiloil "Arctic"

All are branded with the red Gargoyle, which is our mark of manufacture.

They are put up in 1 and 5 gallon sealed cans, in half-barrels and barrels.



## Mobiloil

VACUUM OIL CO., Rochester, U. S. A.

### BRANCHES:

NEW YORK 29 Broadway    BOSTON 49 Federal St.    PHILADELPHIA 4th & Chestnut Sts.    DETROIT Ford Bldg.    INDIANAPOLIS Indiana Pythian Bldg.    CHICAGO Fisher Bldg.

Distributing warehouses in the principal cities of the world

The above advertisement appears in the Saturday Evening Post, Collier's, Literary Digest, Life, Scientific American, Leslie's Weekly, Cosmopolitan, Munsey's, Review of Reviews, World's Work, Century, Harper's, System, Everybody's, McClure's, Outing.

When Writing to Advertisers, Please Mention Motor Age.



### Correct Lubrication

SMOOTHEST OPERATION    MOST POWER    FEWEST REPAIRS    LONGEST LIFE

*Explanation:* In the schedule, the letter opposite the car indicates the grade of Gargoyle Mobiloil that should be used. For example, "A" means "Gargoyle Mobiloil A." "Arc." means "Gargoyle Mobiloil Arctic." For all electric vehicles use Gargoyle Mobiloil A. The recommendations cover both pleasure and commercial vehicles unless otherwise noted.

MODEL OF	1909	1910	1911	1912	1913
CARS	Summer	Winter	Summer	Winter	Summer
Abbott Detroit	Arc.	Arc.	Arc.	Arc.	Arc.
Alco	Arc.	Arc.	Arc.	Arc.	Arc.
American	Arc.	Arc.	Arc.	Arc.	Arc.
Apperson	Arc.	Arc.	Arc.	Arc.	Arc.
Aston (2 cy.)	Arc.	Arc.	Arc.	Arc.	Arc.
Avery	Arc.	Arc.	Arc.	Arc.	Arc.
Bentley	Arc.	Arc.	Arc.	Arc.	Arc.
Brick (2 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
Brick (4 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
Cadillac	Arc.	Arc.	Arc.	Arc.	Arc.
Cadillac (4 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
Carter	Arc.	Arc.	Arc.	Arc.	Arc.
Com'l.	Arc.	Arc.	Arc.	Arc.	Arc.
Cum.	Arc.	Arc.	Arc.	Arc.	Arc.
Chalmers	Arc.	Arc.	Arc.	Arc.	Arc.
Chalmers	Arc.	Arc.	Arc.	Arc.	Arc.
Cole	Arc.	Arc.	Arc.	Arc.	Arc.
Columbia	Arc.	Arc.	Arc.	Arc.	Arc.
"Knight"	Arc.	Arc.	Arc.	Arc.	Arc.
Cougar Gear	Arc.	Arc.	Arc.	Arc.	Arc.
Daimler	Arc.	Arc.	Arc.	Arc.	Arc.
"Knight"	Arc.	Arc.	Arc.	Arc.	Arc.
Darracq	Arc.	Arc.	Arc.	Arc.	Arc.
De Dion	Arc.	Arc.	Arc.	Arc.	Arc.
Delamare-Belleville	Arc.	Arc.	Arc.	Arc.	Arc.
Elmore	Arc.	Arc.	Arc.	Arc.	Arc.
E. M. F.	Arc.	Arc.	Arc.	Arc.	Arc.
Fiat	Arc.	Arc.	Arc.	Arc.	Arc.
Flanders	Arc.	Arc.	Arc.	Arc.	Arc.
(6 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
Ford	Arc.	Arc.	Arc.	Arc.	Arc.
Franklin	Arc.	Arc.	Arc.	Arc.	Arc.
Com'l.	Arc.	Arc.	Arc.	Arc.	Arc.
G. M. C.	Arc.	Arc.	Arc.	Arc.	Arc.
Grumman	Arc.	Arc.	Arc.	Arc.	Arc.
Grumman-Leggett	Arc.	Arc.	Arc.	Arc.	Arc.
Harrold	Arc.	Arc.	Arc.	Arc.	Arc.
Hewitt (2 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
(4 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
Hudson	Arc.	Arc.	Arc.	Arc.	Arc.
Hupmobile	Arc.	Arc.	Arc.	Arc.	Arc.
"32"	Arc.	Arc.	Arc.	Arc.	Arc.
I. H. C. (air)	Arc.	Arc.	Arc.	Arc.	Arc.
(water)	Arc.	Arc.	Arc.	Arc.	Arc.
International	Arc.	Arc.	Arc.	Arc.	Arc.
Interstate	Arc.	Arc.	Arc.	Arc.	Arc.
Isotta	Arc.	Arc.	Arc.	Arc.	Arc.
Itala	Arc.	Arc.	Arc.	Arc.	Arc.
Jackson (2 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
(4 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
Kelly	Arc.	Arc.	Arc.	Arc.	Arc.
Kelly Springfield	Arc.	Arc.	Arc.	Arc.	Arc.
Kiesel-Karr	Arc.	Arc.	Arc.	Arc.	Arc.
Com'l.	Arc.	Arc.	Arc.	Arc.	Arc.
Kline-Karr	Arc.	Arc.	Arc.	Arc.	Arc.
Knott	Arc.	Arc.	Arc.	Arc.	Arc.
Krit	Arc.	Arc.	Arc.	Arc.	Arc.
Lancia	Arc.	Arc.	Arc.	Arc.	Arc.
Lozmobile	Arc.	Arc.	Arc.	Arc.	Arc.
Louis	Arc.	Arc.	Arc.	Arc.	Arc.
MacK	Arc.	Arc.	Arc.	Arc.	Arc.
Marion	Arc.	Arc.	Arc.	Arc.	Arc.
Marmon	Arc.	Arc.	Arc.	Arc.	Arc.
Matheson	Arc.	Arc.	Arc.	Arc.	Arc.
Maxwell (2 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
(4 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
(6 cyl.)	Arc.	Arc.	Arc.	Arc.	Arc.
Mercedes	Arc.	Arc.	Arc.	Arc.	Arc.
"Knight"	Arc.	Arc.	Arc.	Arc.	Arc.
Mercur	Arc.	Arc.	Arc.	Arc.	Arc.
Michigan	Arc.	Arc.	Arc.	Arc.	Arc.
Minerva "Knight"	Arc.	Arc.	Arc.	Arc.	Arc.
Mitchell	Arc.	Arc.	Arc.	Arc.	Arc.
Moon	Arc.	Arc.	Arc.	Arc.	Arc.
National	Arc.	Arc.	Arc.	Arc.	Arc.
Oakland	Arc.	Arc.	Arc.	Arc.	Arc.
Oldsmobile	Arc.	Arc.	Arc.	Arc.	Arc.
Overland	Arc.	Arc.	Arc.	Arc.	Arc.
Packard	Arc.	Arc.	Arc.	Arc.	Arc.
Palm Beach	Arc.	Arc.	Arc.	Arc.	Arc.
Pathfinder	Arc.	Arc.	Arc.	Arc.	Arc.
Pearless	Arc.	Arc.	Arc.	Arc.	Arc.
Pierce Arrow	Arc.	Arc.	Arc.	Arc.	Arc.
Com'l.	Arc.	Arc.	Arc.	Arc.	Arc.
Pope Hartford	Arc.	Arc.	Arc.	Arc.	Arc.
Premier	Arc.	Arc.	Arc.	Arc.	Arc.
Pullman	Arc.	Arc.	Arc.	Arc.	Arc.
Rambler	Arc.	Arc.	Arc.	Arc.	Arc.
Rapid	Arc.	Arc.	Arc.	Arc.	Arc.
Rayfield	Arc.	Arc.	Arc.	Arc.	Arc.
Regal	Arc.	Arc.	Arc.	Arc.	Arc.
Renault	Arc.	Arc.	Arc.	Arc.	Arc.
Rex	Arc.	Arc.	Arc.	Arc.	Arc.
S. G. V.	Arc.	Arc.	Arc.	Arc.	Arc.
Selden	Arc.	Arc.	Arc.	Arc.	Arc.
Service	Arc.	Arc.	Arc.	Arc.	Arc.
Simplex	Arc.	Arc.	Arc.	Arc.	Arc.
Speedwell	Arc.	Arc.	Arc.	Arc.	Arc.
"Mead"	Arc.	Arc.	Arc.	Arc.	Arc.
Stanley	Arc.	Arc.	Arc.	Arc.	Arc.
Sumner	Arc.	Arc.	Arc.	Arc.	Arc.
"Knight"	Arc.	Arc.	Arc.	Arc.	Arc.
Stevens Duryea	Arc.	Arc.	Arc.	Arc.	Arc.
Stoddard-Dayton	Arc.	Arc.	Arc.	Arc.	Arc.
"Knight"	Arc.	Arc.	Arc.	Arc.	Arc.
Studebaker	Arc.	Arc.	Arc.	Arc.	Arc.
Stutz	Arc.	Arc.	Arc.	Arc.	Arc.
Thomas	Arc.	Arc.	Arc.	Arc.	Arc.
Walter	Arc.	Arc.	Arc.	Arc.	Arc.
Warren	Arc.	Arc.	Arc.	Arc.	Arc.
White (Car)	Arc.	Arc.	Arc.	Arc.	Arc.
(Steam)	Arc.	Arc.	Arc.	Arc.	Arc.
Winton	Arc.	Arc.	Arc.	Arc.	Arc.

# **This Ad. is for Automobile Dealers Only— and Only the Live Ones**

**YOU'VE BEEN HOPING** and praying for years for the kind of car you thought some big manufacturer ought to build, and that you knew you could sell.

**THAT IS TO SAY**, a light touring car of about 25 horse power, made so well the maintenance cost would be as little or less than any other car on the market; one that would look the part, act the part, and yet sell in the neighborhood of \$700.

**THAT WAS ABOUT THE PRICE** you set—wasn't it?

**YOU'VE ASKED** for that kind of a car, insisting that it be one the owner wouldn't feel he ought to leave in the alley so the neighbors wouldn't see it!

**A CAR FOR THE KIND OF OWNER** who wants his money's worth in looks as well as performance, and who doesn't care to be pointed out as one who bought the cheapest car.

**SUCH A BUYER**, you've told us, would pay a few dollars more to have a car that was worth more than the difference.

**YOU'VE KNOWN** that there were only two, or possibly three, concerns in the world that could make such a car at such a price. Millions of capital, and plants equipped with special automatic machines throughout for making every last part of the car, are necessary.

**AND DOUBTLESS IT HAS** occurred to you that the reorganized Maxwell Motor Company is in an ideal position to produce such a car—having the capital, the plants, the organization—and a clean slate. That is to say, plants ready for the work and no old models or material in course of construction.

**AND, YOU'VE HEARD WHISPERINGS** that that was the sensation the new Maxwell Motor Company had up its sleeve.

**WELL, WE HAVE**—and we've tried to keep the details from getting out because we didn't want to start a stampede of buyers until we were ready to supply the cars. But you can't send test cars all over the country—as we had to do to prove up this product to our own satisfaction—without starting trade gossip. And trade gossip goes fast and far. It isn't always accurate but it goes just the same.

*(Continued on next page)*



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**WE ARE STILL DETERMINED** to withhold all detailed specifications and the real price from the public until we are ready to deliver a few thousand cars—or at least until demonstrators are in the hands of our dealers.

**PAST EXPERIENCE** with stampedes of the kind that will certainly ensue when the features of this car are generally known, teaches us that our plan is right.

**BUT MEANTIME**—and here's why we are publishing this ad to dealers—the information is leaking out; dealers are coming to Detroit wanting to contract.

**THAT'S ALL RIGHT**—but we want to start right with this proposition. It's going to be the biggest, greatest thing this organization has ever done—and you know the men who comprise the Maxwell organization of designers, production, sales and advertising experts—from Mr. Flanders down—have done the biggest things that have ever been done in this industry.

**WE WANT TO START RIGHT.** We want to select the best dealer in each town—the one who has the best standing locally, and the kind of fellow who will take hold of this product, not for a day, but for his whole future—to go along and stay with us while we both make money and at the same time giving the buyer more for his money than he can possibly get elsewhere.

**IT'S A QUANTITY PROPOSITION** and when you see the car you'll say it is a permanent proposition.

**THAT'S WHAT YOU'VE BEEN LOOKING FOR**—that's what we've been aiming at in producing this car. Coupled with our \$1,085 "35-4" and our \$2,350 "50-6", here's the greatest line in the world—and any maker who tries to compete, either in quality or price, will have to go some.

**NOW HERE'S WHAT INTERESTS YOU** at this moment. You can't very well refuse to sign up with the other dealer who comes from your territory. We appreciate his coming—it shows he is on the alert. That's always a good sign.

**BUT HE MAY NOT BE THE BEST** man for us to tie to—how are we going to know unless you come and tell us?

**SO WE DECIDED** to tell all dealers that we are ready to contract for these "25's" as well as the "35" and the rest of the line.

**WE'VE ARRANGED** to have all our District Managers in Detroit next week (April 14 to 19). It will be the first glimpse they've had at this "25" car themselves—and you may imagine they are as eager to see and ride in it as you are.

**THE DISTRICT MANAGER** of your territory will be here at the main office—so you can get right down to business with him if you are on the ground.

**EVERY DEALER IN AMERICA KNOWS** the heads of this organization. You all know Walter E. Flanders. He has always given his buyers more—and forced his competitors to give theirs more, than they wanted to.

**HE IT WAS WHO FIRST SAID**, “Magneto included, of course.” He who first put a “foredoor” body on a thousand dollar car—after cutting the price of the most popular and the greatest \$1,250 car to \$1,000. It was Flanders who forced all other makers to equip with demountable rims, by doing it first. He who said, “Same electric starter as the Peerless,” on a \$2,350 car, when most \$5,000 cars were still without starters.

**AND FLANDERS HAS DONE MORE** for the dealer than any other. He it was who five years ago originated the “sliding scale of discounts” to stop the gouging of the little fellow—the small dealer, who in the aggregate, disposes of 80 per cent of the product. He, who sent a copy of his dealer’s contract to every dealer in the United States to show that all were treated alike, while other makers were “dickering” with theirs. Yes, you know Flanders—and you know why other dealers don’t approve of his methods. Good reason, isn’t there?

**AND YOU KNOW McGUIRE**—if you don’t happen to know him personally, you certainly know him by reputation. Wm. F. McGuire is known in trade circles as the former production manager of the Ford Motor Company—the man who seemed to create cars by miraculous methods. Mr. McGuire as the “man behind” isn’t so well known to dealers, but you’ve heard it said if there’s one man in the industry who can produce quality cars in greater quantities than any other, it is McGuire. Come and meet him—he’ll show you the “25” himself.

**E. LE ROY PELLETIER** you all know personally. You know his advertising, and its instantaneous results. “Roy’s” advertising has sold more automobiles than that written by any other man. He knows you, knows your problems and knows your territory. Besides handling our national campaign, Mr. Pelletier will furnish you with copy to run locally and, when occasion requires, he will be glad to write special copy to meet your local conditions.

**YOU’LL MEET TWO NEW FACES**—Walter M. Anthony, Comptroller, and C. A. Forster, Commercial Manager, in charge of sales.

**MR. ANTHONY IS THE MAN** you’ll deal with at the financial end—and you’ll like him. He’s a rare combination of keen business acumen and royal good fellowship. In short, he is a business man of breadth and character and poise—and a saving sense of humor. You’ll like Anthony—and that makes business dealings a lot more pleasant.

*(Continued on next page)*



(Continued from previous page)

**AND YOU'LL LIKE FORSTER.** He comes from the Burroughs Adding Machine Company. We don't know it all yet in the automobile business, you know, and tho' you'll look with suspicion on a new man in this industry, that impression will be dispelled in the first five minutes you are with Forster—and then you'll agree that he, as well as Anthony, "belongs" in this organization of specialists and experts.

**AND YOU'LL FIND** in the other officers and in the factory, not scores, but hundreds of men you've known for years—experts, specialists all, and you'll conclude that if the kind of car you've been wanting—the kind you'd design and make yourself if you had the capital and the facilities—can be made, then this organization can make it—to the Queen's taste—and yours.

**THE CAR IS HERE** ready to see and to ride in. Deliveries in quantities will begin in June. You've been looking for this car for years—come to Detroit on the first train; see and try it out for yourself—and tell us why you think you can sell more of them in your territory than any other dealer.

**NOW MULL THIS OVER:** You must realize—you who have watched the trend of things—that this automobile business will gradually narrow down to a few big ones. It will be a contest between giants.

**TODAY, WHEN MARGINS OF PROFIT** to the maker are so small that ninety per cent of all the buyer pays goes into actual automobile value and service; when, in other words, the profit per car is very small, only those makers who have the financial backing, the facilities and the experience necessary to produce cars in quantities, can survive.

**WE'LL TELL YOU FRANKLY** that we are going to be very careful in selecting our representatives, but once we've signed up with a dealer it will be our policy to stick to him as long as he is 80 per cent plus—in other words, as long as he does anywhere near right by us and by his trade.

# Maxwell Motor Company

Executive and Sales Offices

Detroit, Mich.



**\$1.00**

each, from your  
dealer or direct

# Bosch Plugs

**As Good As Bosch Magnetos**

fill a long-felt want. The trouble and embarrassment caused by cheap and poorly designed plugs are not to be accepted as inherent in all spark plugs: equip with Bosch Spark Plugs and even the possibility of unsatisfactory service is eliminated.

The design of Bosch Plugs is based on scientific principles, the result of the most extensive ignition experience; they are

constructed with the sole view of providing a perfect plug, one which will not be affected by rough handling, continuous usage, vibration, carbon, or excessive lubrication.

Bosch Plugs are so built as to uphold the name they bear—the first-grade material worked to perfection by the same hands and brains that have built the world-wide reputation for Bosch Magnetos, the superior ignition source.

Bosch Plugs are used regularly on such well-known and excellently designed cars as the Peerless, Pierce-Arrow, Hudson, Mercer, Garford, Rambler, Fiat, Lancia, Metallurgique. Insisting upon Bosch gives you equal equipment.

*"Locating the Spark Plug" tells you all you should know  
about Spark Plugs; write for it today*

**\$1.00**  
**Each**

Bosch Plugs are sold by all reputable dealers throughout the United States, or if they have not stocked, may be obtained via Parcel Post from Bosch Distributors, or any Bosch Branch.

**Bosch Magneto Company, 214 West 46th Street, New York**

Chicago

::

Detroit

::

San Francisco

::

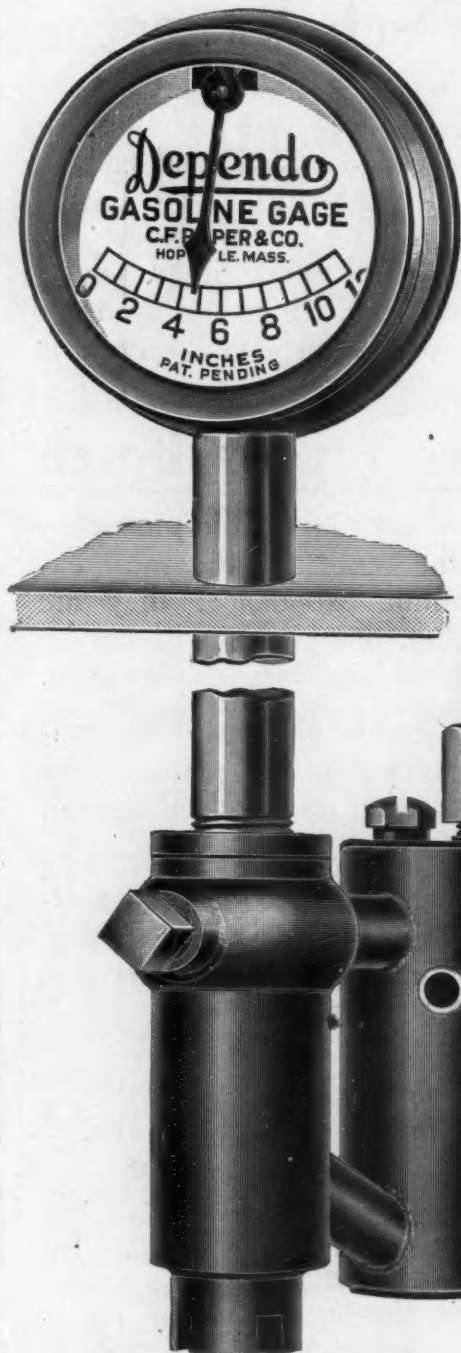
Toronto

Address Bosch Distributors at Portland, Me.; Boston, Mass.; Buffalo, N. Y.; Rochester, N. Y.; Philadelphia, Pa.; Pittsburgh, Pa.; Baltimore, Md.; Richmond, Va.; Atlanta, Ga.; Toledo, Ohio; Minneapolis, Minn.; Des Moines, Iowa; Omaha, Neb.; Kansas City, Mo.; St. Louis, Mo.; Denver, Col.; Seattle, Wash.; Portland, Ore.; Los Angeles, Cal.



# AT LAST!!

A Gasoline Gauge for Automobiles That Is Accurate and Dependable—Up Hill, Down Hill, On Side List and on the Hottest and Coldest Days, Shows at a Glance the Amount of Gasoline in the Tank.



## THE Dependo GASOLINE GAUGE

(ATTACHES TO THE DASH)

### \$7.50

BRASS OR NICKEL FINISH

#### Some of Its Many Advantages

No more Dry Tanks miles from garage.  
No more pulling up cushions to run measuring stick into tank.  
Detects Leaky Tanks immediately.  
Shows instantly amount of gasoline going into tank and amount being consumed per mile.

As dependable as your watch, and will not get out of order. Full directions for installing sent with each gauge.

SUPPLIED AT PRESENT FOR THE 1912-1913

**Ford, Overland, Buick, E. M. F.  
and the 1913 Studebaker**

*When Writing State Model*

If for other cars, send us name, model and year and we will notify you if we can supply you. Not made at present for cars having pressure tanks.

If your dealer cannot supply you, we will direct, on receipt of price.

Catalog No. 8 giving full particulars sent free.

#### A WORD TO DEALERS

The Dependo Gasoline Gauge is the first and only dependable one ever invented. Yet you know the demand for a gauge of the character of Dependo has been and is insistent. Our campaign of national advertising which starts March 1, will surely augment that demand and show how Dependo will surely fill that demand to the letter.

You will have many calls for The Dependo. Why not stock Dependo at once and thus be able to fill orders promptly. Our proposition to dealers means dollars to you. Write us today for full particulars and catalog.

## C. F. ROPER & CO., Hopedale, Mass.

# Oakland

## "THE CAR WITH A CONSCIENCE"

¶ We call the Oakland "The Car with a Conscience."

¶ You have probably thought that this is a far-fetched statement because a piece of machinery cannot have a "Conscience."

¶ What we want to convey by this slogan is that those who are responsible for the manufacture of the car are building it conscientiously.

¶ Let us show you what we mean:

¶ "The Car with a Conscience," first of all, means a car that is, from an engineering standpoint, correct—not in theory—not on paper—but actually—in every hour—every day service.

¶ "The Car with a Conscience" means the use of proper materials—no skimping—no substituting. "The Car with a Conscience" does not mean the use of basic metals or other substitutes, for alloy and nickel steel.

¶ "The Car with a Conscience" means an honestly built car—honest in design, honest in construction, honest in its value-offering to you.

¶ "The Car with a Conscience" stands for simplicity—just enough machinery to deliver the rated horse power to the rear wheels. The simple car is an accessible car, which means a better cared for car.

¶ "The Car with a Conscience" stands for individuality and beauty in body design—beauty and luxury as found in but few cars regardless of price. Each Oakland embodies extreme refinement and symmetry. In the interior of the body, the comfort of

the passenger has been minutely looked after—even to the particular angle at which the cushions and backs are upholstered. The cushions—10 inches deep—soft and rich and give you a feeling of complete rest and relaxation.

¶ "The Car with a Conscience" means a motor so extremely quiet at all times that Oakland power plants have been signaled for special mention in this respect. Owners have marveled at the smooth way in which the motor runs. Extreme care in the making of parts, superior bearings, perfect lubrication, gears that are cut correctly and proper carburetion have made Oakland motors famous—inquire of the first Oakland owner you meet.

¶ "The Car with a Conscience" is meant for the man who insists on the fullest value for his money—for the man who buys a motor car with his eyes wide open—who buys only after he has made a comparison of all cars on the market—regardless of price.

¶ "The Car with a Conscience" is such a car that its manufacturers court the widest comparisons.

¶ "The Car with a Conscience" is our highest achievement and challenge to the minutest examination and widest comparison. We know "The Car with a Conscience." We want you to know.

¶ "The Car with a Conscience" is made in a wide range of body designs and horse power ratings. Four and six cylinder models, \$1000 to \$3000. Delco electric starting, lighting and ignition system on two of the models.

**Oakland Motor Car Co.** 100 Oakland Boulevard **Pontiac, Mich.**



# Letters From Stearns-Knight Owners

[No. 18]

**"Better than any 'Light Six' and still  
a 'Four' on the expense account"**

" \* \* \* It is this simplicity and thorough accessibility, making for the greatest economy of operation and the highest efficiency that most highly recommended the Stearns-Knight to me. I have a 'four' that can do all and more than any of the 'Light Sixes' and is still a 'four' on the expense account. I selected the Stearns-Knight practically from the field after a year of investigation, and experience has fully approved my judgment."

(Name Furnished Upon Request)

**Stearns**  
THE ULTIMATE CAR  
(KNIGHT TYPE MOTOR)

## The F. B. Stearns Company

Cleveland, Ohio

Branches and Dealers in 125 Cities



*Makes Every Gasoline  
Motor Worth More*

**Polarine**  
FRICTION REDUCING MOTOR OIL

Polarine starts to lubricate at the **first turn** of the motor—even in winter, after standing for hours at a temperature of zero. It **maintains the correct lubricating body** at any motor speed or heat, on the hottest summer day.

It penetrates to every part and gives it full protection. It keeps friction at the no-wear point and thus obviates many costly repairs.

And it serves in any type of motor—motor cars, motor boats, motor trucks.

Don't spoil a good motor with poor oil. And don't judge motor oil by appearance. The **poorest** oils may **look** as good as the best.

Polarine is made by the **World's Oil Specialists** after fifty years' experience with every kind of friction problem. Present day possibilities do not permit of the making of any better oil. All our vast facilities and resources are concentrated on Polarine.

**Standard Oil Company**  
(AN INDIANA CORPORATION)

Makers of Special Lubricating Oils for Leading  
Engineering and Industrial Works of the World

(110)



**\$985**

F. O. B. Toledo

*Completely Equipped*

Self-Starter  
30 Horsepower  
5-Pass. Touring Car  
110 Inch Wheel Base  
Timken Bearings  
Center Control

**Overland****\$985**

F. O. B. Toledo

*Completely Equipped*

Remy Magneto  
Warner Speedometer  
Mohair Top and Boot  
Clear Vision, Rain Vision  
Wind Shield  
Prest-O-Lite Tank

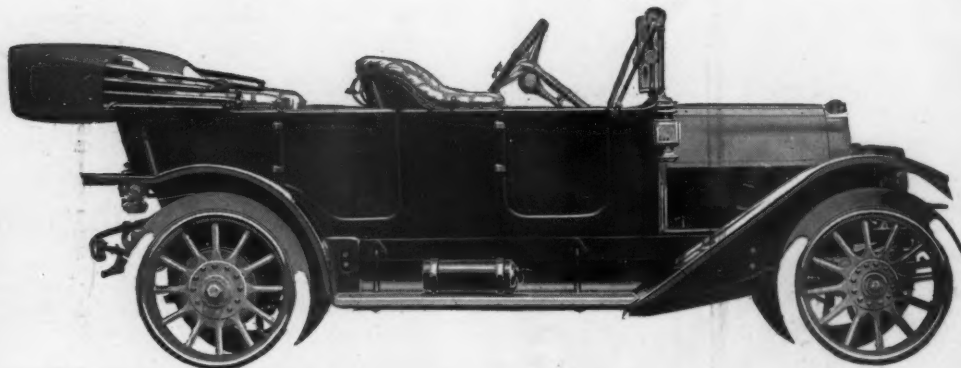
**T**HE 28,000 Overlands built in 1912 were such startling good cars—that 24 hours after our 1913 announcement we had contracts for our entire 1913 output of 40,000 cars.

Here is our policy: The more cars we make the less each car costs us—and you. And the better we make Overlands the more we sell. It is just broad-gauged business.

Study the value above.

Catalogue on request. Please address Dept. 46.

**The Willys-Overland Co., Toledo, O.**



# NEW-MILLER CARBURETOR

## Means New Life for Your Car

Don't "tinker" and worry with carburetor troubles. Find out today about the New-Miller.



## Here Is What It Actually Does

- (1) Takes care of any grade fuel from gasoline to distillate.
- (2) Adjust from seat for all weather conditions.
- (3) Throttles down without knocking.
- (4) Gives maximum power on low, intermediate and high.
- (5) Mechanically adjusted by throttle opening or closing.

The slightest movement of the Butterfly throttle moves the "air piston" and "needle" connections, regulating exactly the proportionate supply of gasoline and air, at all speeds.

Once adjusted you never have to change it. It takes care of itself.

Racing, road tests and daily service have proved it. **Leading makers of automobiles, trucks and motor boats are adopting it as standard equipment.**

Gravity of gasoline is going lower every day and the lower it goes the more apparent be-

comes the necessity for the New-Miller mechanical carburetor.

### Pays for Itself

A season's use will easily save you fuel and repair expense to pay for a New-Miller and freedom from carburetor troubles on your car.

We stand ready to prove this.

You can prove it for yourself if you will take the time to send for the New-Miller Booklet.

Go over it carefully. The facts are self-evident.

**NEW-MILLER  
CARBURETOR CO.**  
**514 N. Capitol Ave., Indianapolis, Ind.**

#### FACTORY DISTRIBUTORS:

E. J. EDMONDS CO. .... 1783 Broadway, New York  
SMITH BROS.-Ellis. .... 311 W. Pico, Los Angeles, Cal.  
Agencies in all leading cities. Ask us for name of your nearest dealer.

#### USE THIS COUPON TODAY!

NEW-MILLER CARBURETOR CO.,  
514 N. Capitol Ave., Indianapolis, Ind.

Gentlemen:

Send me full particulars on the New-Miller.

My car is .....

Manifold is .....inches.....

Name .....

Address .....





**Full Complement of Balls. Solid One-Piece Separator. Uninterrupted Raceways. Full Depth of Raceways, to Resist Thrust.**

The absence of any one of these four obvious essentials means a sacrifice of either capacity or endurance. Gurney Ball Bearings are the only ball bearings in which all of these essentials are always present and which possess raceways of the right contour.



A full complement of large balls—deep, uninterrupted raceways of right contour—and yet a solid, one-piece

### Ball Separator

This unique Gurney separator plays a mighty important part in sustaining the Gurney reputation for great capacity and great endurance. It is so sturdy and fool-proof that separator troubles are never encountered in using Gurney Bearings.

Die cast, of special wear resisting alloy, this separator, as the name implies, has no joints, screws or clips to come apart or loosen or otherwise interfere with continuous bearing performance. In fact, the separator will be the last part of the bearing to wear out.

The use of this unique separator does not necessitate a reduction in the number of balls. With it, it is practical and safe to run the balls much closer together than with any other separator ever made. The partition or septum between each pair of balls is so efficient and so durable that it does not have to be so thick as to displace some of the balls and so reduce the capacity of the bearing.

Bear in mind always when considering ball bearings that most important is the question of raceway contour, for just so far as you fall short of right contour, in just so much do you fail to realize the full efficiency to which you are entitled.

## Gurney Ball Bearing Co.

Jamestown, New York

**GURNEY**

**Ball Bearing Shaft Hangers**

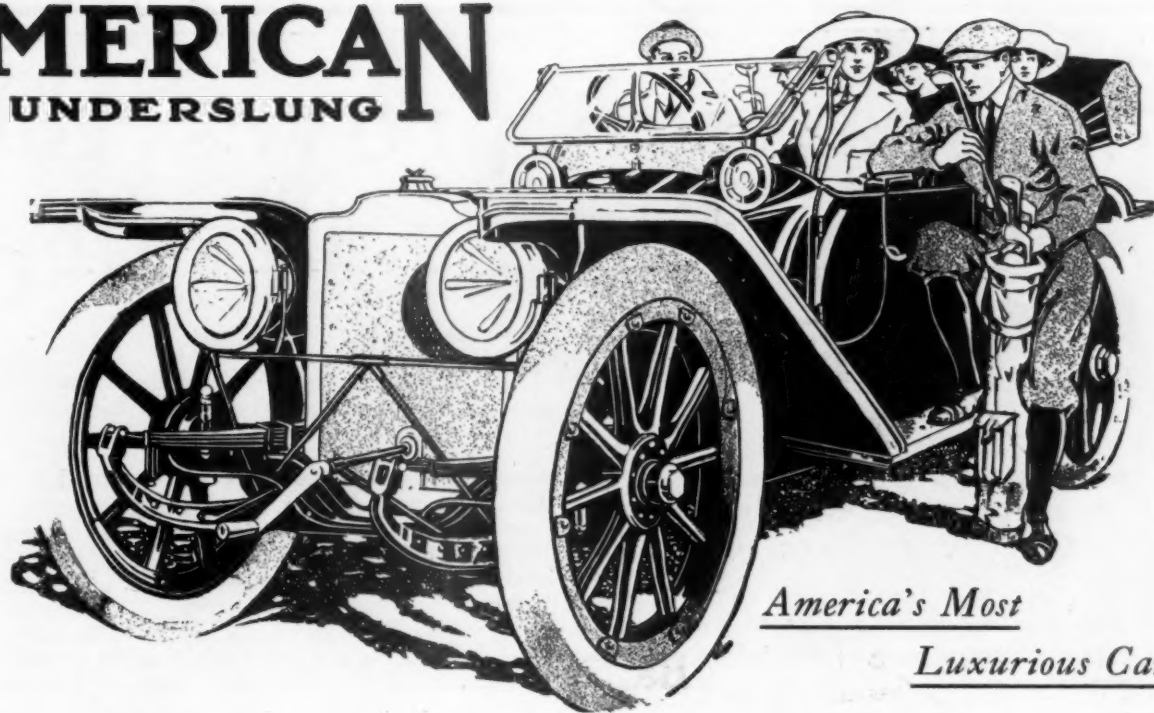
Save power, oil and repairs.  
Increase your power capacity.



When Writing to Advertisers, Please Mention Motor Age.

# AMERICAN

## UNDERSLUNG



*America's Most  
Luxurious Car*

## For Season of 1914 Deliveries Now

### SIX CYLINDERS

#### SIX-PASSENGER (TYPE 666)

Motor 4½x6 inches; 140-inch wheel base; 39x5-inch tires; four-speed transmission; positive electrical starting and lighting; high-tension ignition (dual system).

Regular equipment includes full electrical outfit, 100-mile Warner speedometer and clock, plate-glass windshield, mohair top and storm curtains, electric horn, shock absorbers, two extra demountable rims, and full set of tools. Colors optional. Price, f. o. b. Indianapolis.

**\$4,500**

### SIX CYLINDERS

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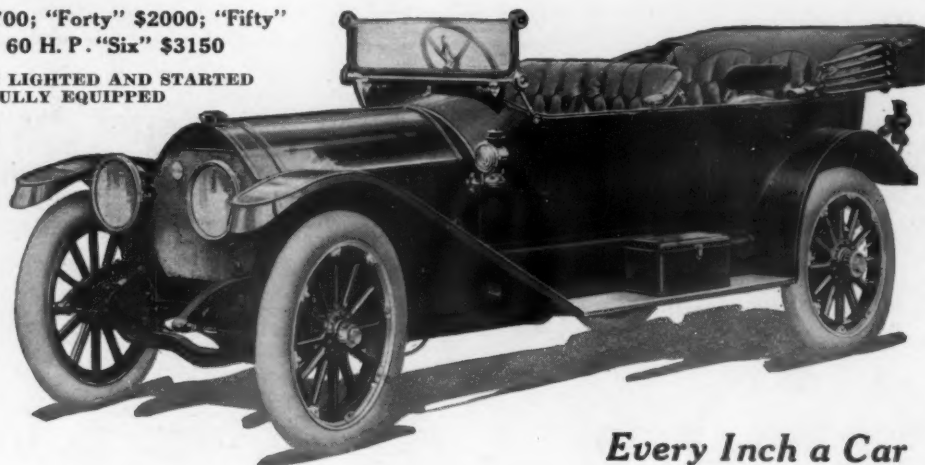
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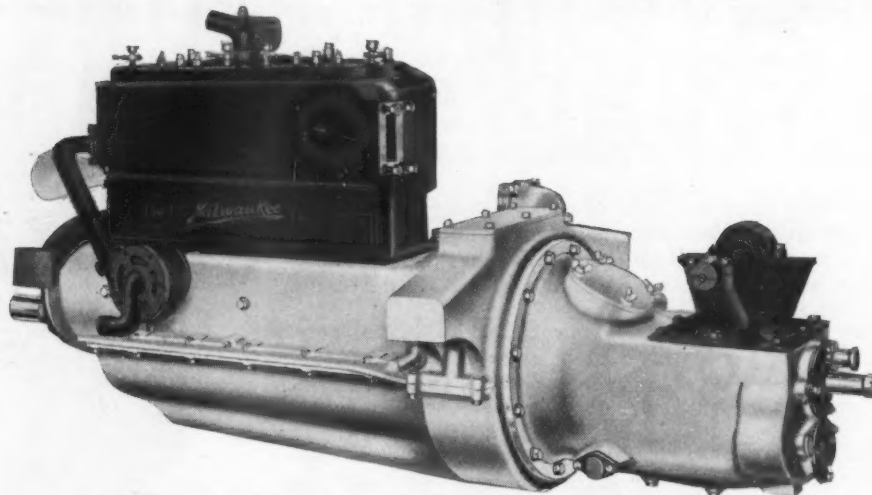
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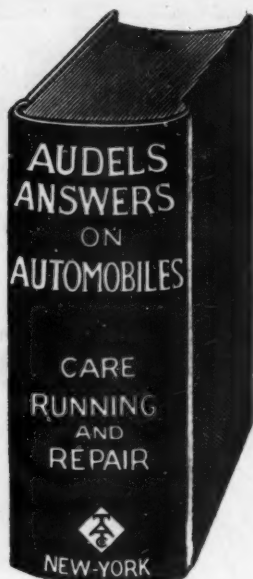
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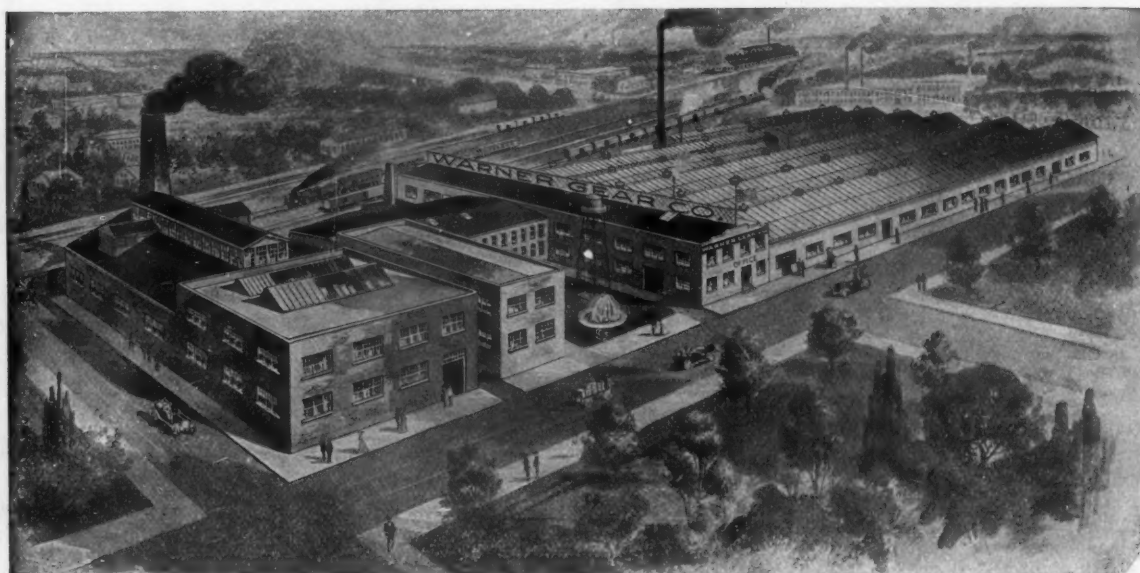


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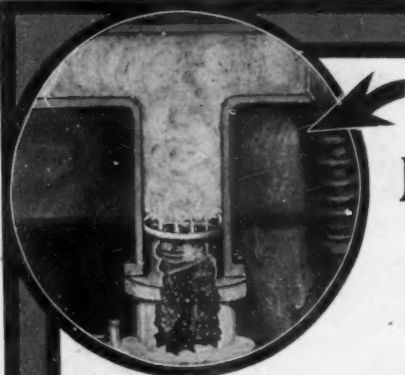


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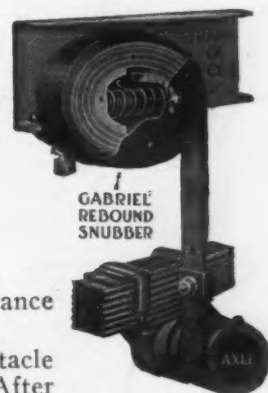
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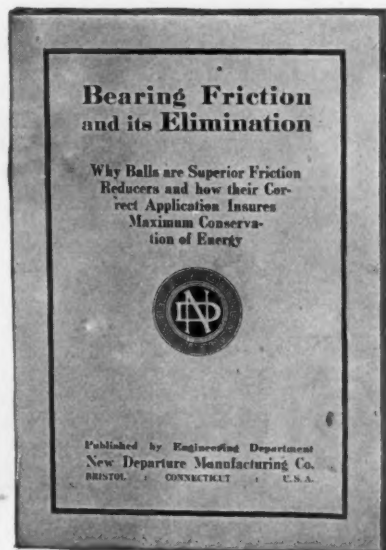
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on the Application of Electricity in the production of the Ignition Spark in Petrol Motors  
By T. H. HAWLEY

Author of  
"Motors in Principle and Practice," "Petrol Motors Simply Explained," etc.

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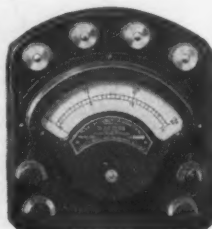


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Detroit, Ford Building, H. E. Butcher  
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**15 Canal Place. New York**

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The Electric Current is strong in a cat. It is magnetism that draws—and our Latest Cat-a-Log is a Magnet that will bring you closely in touch with us.

In this instance we want this cat just let out of the bag to act as the electric magnet to move every Automobile Accessory Dealer to immediately request us to send him our Latest Cat-a-Log. It is a Veritable Encyclopedia of Automobile Equipment. It contains many new things you will want to handle.

### Remember Our Cardinal Virtues

We are the Only Exclusively Wholesale Automobile Accessory House in America.

Our prices are right. We will positively not be undersold.

We do not sell goods to other than those houses recognized as legitimate automobile accessory dealers.

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"EVERYTHING ELECTRICAL FOR AUTOMOBILES"



## Your Engine Is As Efficient As Its Ignition

Your engine may be the best in the world but faulty, unreliable ignition gives the owner the impression that the trouble lies in the engine. Equip your cars with

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## Ignition Apparatus

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and know they will operate satisfactorily after leaving the factory.

Descriptive booklets on request  
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Manufactured by **PITTSFIELD SPARK COIL COMPANY**  
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OFFICES IN ALL PRINCIPAL CITIES





**Stops radiator leaks.  
Quickly, permanently.  
Finds a leak and fixes it  
in fifteen minutes.**

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**Just pour in Se-ment-ol**

It dissolves in the water and congeals as it passes thru the leak. Repair is permanent.

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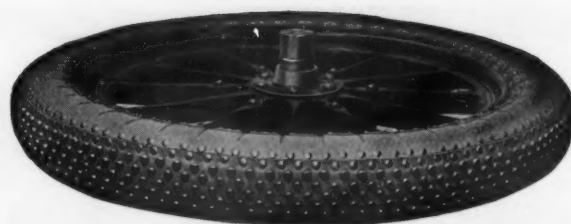
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SELF-ACTING RADIATOR CEMENT

THE CHEMICALLY CORRECT RADIATOR CEMENT

Price 75¢

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## Guaranteed 5,000 Miles Without Puncture

With Durable Treads we give a written guarantee for 5000 miles without puncture. This is binding whether your tires are new or old, tread-worn, rim-cut or rut-worn. They are the **only** protectors built to do so.

Durable Treads reduce the cost of your tire up-keep 50%. They save delays and troubles. They absolutely prevent skidding, without injuring your tires.

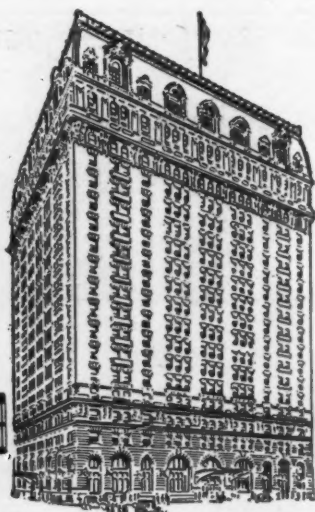
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cost half the price of tires. They make your tires wear three seasons instead of one. We let you test Durable Treads at our expense—you send no money—promise nothing. Write us at once for details of test plan, special discount, sample, etc. Learn how Durable Treads save you \$50 to \$200 each season.

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**CHICAGO'S FINEST HOTEL**

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Located in the heart of the city, within easy reach of all railway terminals

### RATES

<b>ONE PERSON</b>	Room with detached bath.....\$2 to \$3 per day
	Room with private bath.....\$3 to \$5 per day
<b>TWO PERSONS</b>	Room with detached bath.....\$3 to \$5 per day
	Room with private bath.....\$5 to \$8 per day
<b>TWO CONNECTING ROOMS WITH BATH</b>	
Two persons.....	\$5 to \$8 per day
Four persons.....	\$8 to \$15 per day
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Nature's way—where the temperature hovers close around 57° all the year. It does not matter whether it is "zero" or hot enough to melt the pump, it will not explode.

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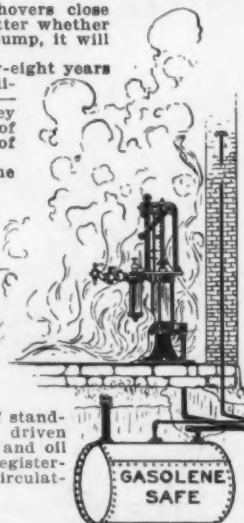
### S. F. Bowser & Co., Inc.

Home Plant and General Offices  
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Sales Offices in All Centers and  
Representatives Everywhere

Original Patentees and manufacturers of standard, self-measuring, hand and power driven pumps, large and small tanks, gasolene and oil storage and distributing systems, self-registering pipe line measures, oil filtering and circulating systems, dry cleaner's systems, etc.

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## MAYO SPARK PLUG PUMP

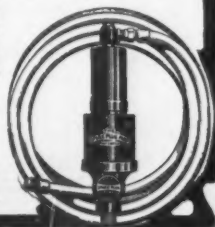
A simple and powerful pump adaptable for use on all cars from the smallest Ford to the largest Lozier. Instantly attached by substituting it for a spark plug. Pumps nothing but pure, fresh air. Inflates the tire in from 2 to 4 minutes. Built with metal rings like your engine and will last as long. Requires no attention other than an occasional drop of oil.

Weighs only 2½ pounds.  
Furnished with adapters to fit any car, 12 feet of hose and connections.  
Price \$10.00. With Pressure Gauge, \$2.00 extra.

You can try it on your own motor before purchasing

The Mayo Mfg. Co.  
55 E. 18th St., Chicago

**\$10.00**



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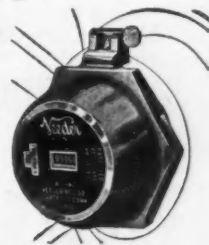
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Neat, durable and compact, it can be easily attached. Price complete **\$25.00**

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Neither  
Rain, Mud  
Nor Dust  
Can Harm

your luggage when it is carried in the new rain-proof, water-proof

## Kamlee Auto Trunk

"Made by Trunk Makers Who Are Motorists"

Embodies every desirable feature—strength, lightness, durability, beauty. It adds to rather than detracts from the appearance of any car.

Consider these exclusive Kamlee features before you buy an auto trunk, then you'll surely select a Kamlee: patent drop front—no lifting of lid—patent inter-locking edge makes it air-tight, dust-proof, rain-proof; no straps to bother with in opening; fitted with standard suit-cases permitting removal of one party's luggage without disturbing others.

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## Why the K-W Master Vibrator For Ford Cars?



Price, \$15.00

Because It Positively Gives  
A HOTTER SPARK  
A SMOOTHER RUNNING ENGINE  
EASIER STARTING  
MORE POWER  
LESS CARBON DEPOSITS  
CLEANER SPARK PLUGS

Over 38,000 Ford Owners Have Installed Them

and more are doing so every day. Watch the number grow monthly. Our Guarantee: Try the K-W Master Vibrator for 30 days and if you can get along without it return it and we will send you your money back and ask no questions. Send for folder.



Get K-W and that Satisfied Feeling

THE K-W IGNITION CO.

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We make a complete line of ignition apparatus.

Agents in all Principal Cities

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**M**ETERS are as essentially a part of the electric lighting equipment as gauges are a part of the steam boiler, and who would think of operating even a small steam heater without suitable gauges?

True, the hazard is greater with the boiler, but the safety valve takes care of that.

By means of the gauges you are enabled to operate your boiler more intelligently and increase its efficiency.

If a manufacturer tells you that meters are unnecessary with his lighting equipment, he deceives himself. If you rely on his statement, you deceive yourself.

## Hoyt Meters

are the accepted standard in automobile lighting.

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**Hoyt Electrical Instrument Works**  
**Penacook, N. H.**



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is the best thing to rout grease and grime, stains, soot, rust, tarnish—any form of uncleanness from anything.

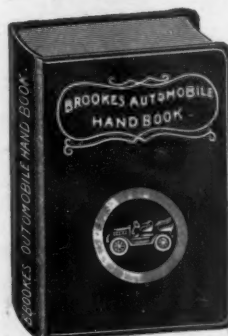
Old Dutch Cleanser takes hold with vim. Makes the cleaning easy and quick and does away with hard rubbing with ordinary soaps and powders. The place for Old Dutch Cleanser is everywhere, all the time.

Many Uses and Full Directions on Large Sifter Can—10c.



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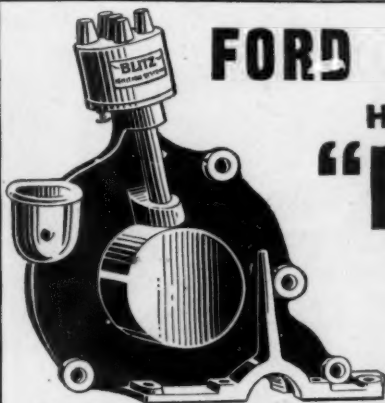
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Made for your car

It Stops all of Your Ignition Troubles

Uses Ford Magneto Current

No more Sticking of Platinum Points

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No more Missing. Every miss means a strain on every part of your car, even to the tires.

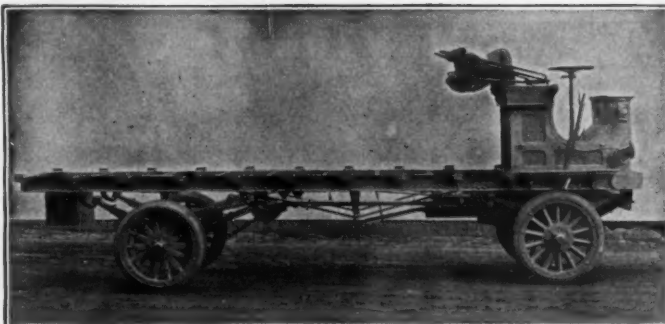
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Results Count:—Uniform Spark, Perfect Timing, More Power, Smooth Running, Easier Starting.

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The Reacto will clear the way on the busiest thoroughfares. Equally satisfactory for country driving or city use.

A strictly high-grade horn, strong throughout. Dust and waterproof.

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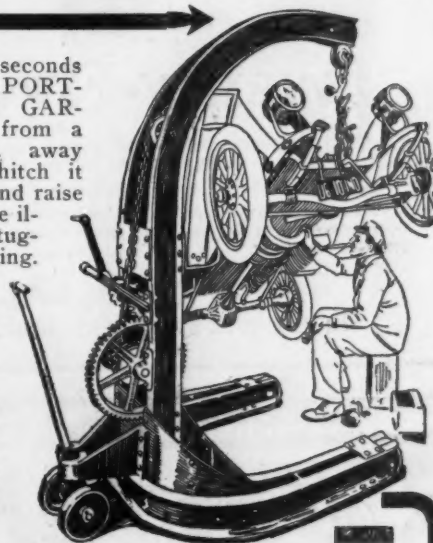
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One man in 45 seconds can move a PORTABLE STEEL GARAGE CRANE from a position 15 ft. away from the car, hitch it onto its frame, and raise it as shown in the illustration. No tugging. No lifting.

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**THE CROXTON MOTOR CAR COMPANY**  
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DEALERS EVERYWHERE



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Five passenger touring car...\$1475  
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The same chassis is used for both models  
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of your fuel consumption and increase your power. Prevent back-fire. Wolf Gasoline Mixers do this. No moving parts to loosen. No screens to clog. Inserted in intake manifold. Prices up to 1½"—\$1.50, 1 9/16" to 2"—\$2.00. Special for Ford Model T, \$1.00. Agents wanted.

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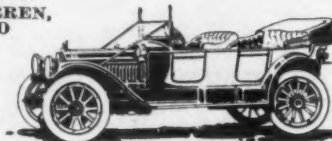
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(20)

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Style A will run 50,000 miles with one filling of the grease caps

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**For Ford Model T Cars  
Are 100 Per Cent Efficient**

They are dependable, strong and sure. Do away with that back-breaking job of spinning your engine with a crank.

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Mends tube punctures as perfectly as the most elaborate garage outfit. Carry it with your car and be prepared for any emergency. Anyone can use it anywhere. Every motorist needs it.

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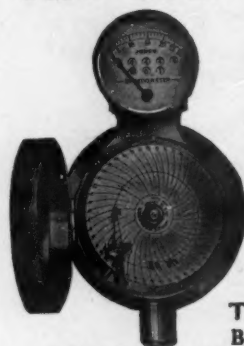
## RAJAH GIANT PLUG

Extra strong and heavy. Perfectly simple—only four parts, which are easily taken apart for repairs or replacement. Only highest grade, imported, hard fire porcelains used. Minutely accurate, well finished machine work. No thumb screws—a Rajah Clip Terminal supplied with every Plug. Price, \$1.50 postpaid—the most economical Plug made. Send for catalog.

Rajah Auto Supply Co., Bloomfield, N. J.

John Millen & Son, Ltd.—Montreal, Toronto, Vancouver, Winnipeg.

## Are Your Trucks Efficient?



You can only determine by record of performance. Human records are not reliable—

### The Jones Recorder

furnishes reliable performance records. The record is in the form of a graphic chart—easily interpreted and easily understood. The lines on the chart tell the story of speed, of starts, of stops, of distances, of loading and unloading intervals.

It is the means for the elimination of waste in the delivery organization.

Write for further information.

### THE JONES SPEEDOMETER

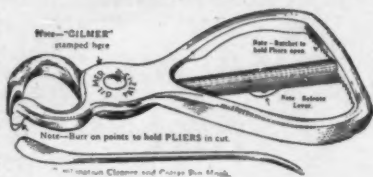
Broadway at 76th Street, New York

Plants, Bush Terminal, Brooklyn, N. Y., New Rochelle, N. Y.

## GILMER Tire Repair Pliers

are as necessary to Car Users as a pocket knife is to you—as useful as a hair pin to a woman. There are 300,000 Car Owners in the United States who KNOW that it pays to repair small cuts in Tires. ARE YOU ONE OF THEM?

Hadn't you best write for free copy of "Tire Insurance," or better, send a dollar for a pair of nickel plated PLIERS and combination cleaner and cotter pin hook. They will pay for themselves the first seventy-five miles. They will pay for a set of Tires every 4,000 miles. We guarantee satisfaction.



G. WALKER GILMER, Jr.

53 North 7th Street

Philadelphia, Pa.

## B. A. Gramm's Motor Trucks

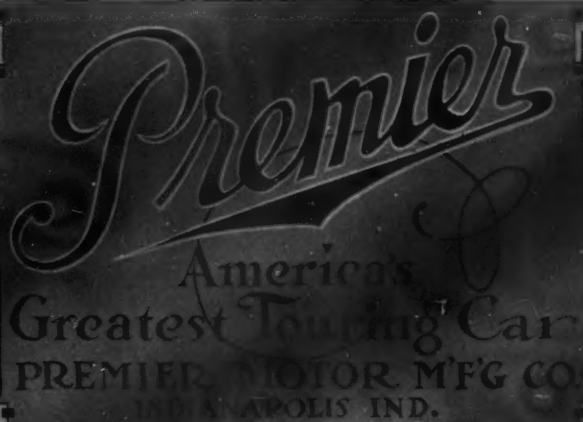
Newest Designs; Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

### The Gramm-Bernstein Co.

Exclusive Motor Truck Builders

Lima, Ohio, U. S. A.



## Elyria-Dean

TRADE MARK

### TUTO 2-Tone HORN ELECTRIC WARNING SYSTEM

Electrically transmits two different and distinct sounds; the degree of sound being regulated by the pressure of the thumb upon one button located on the steering wheel. Sold complete with button and cord, \$25.00.

Elyria-Dean products mfd. only by

THE DEAN ELECTRIC COMPANY  
504 OLIVE STREET ELYRIA, OHIO, U. S. A.

"Look for Elyria-Dean where Quality's seen."

## STAPLEY TIRE PUMP

### Always Ready Always Works

The STAPLEY is a compound pump. Has seamless brass tube cylinders, non-leakable joints, automatic valve and heavy cast base. A Guaranteed tire pressure gauge if you want it.

Price without gauge \$4.00

With gauge \$6.00

BRIDGEPORT BRASS COMPANY

P. O. Station A.

Bridgeport, Conn.



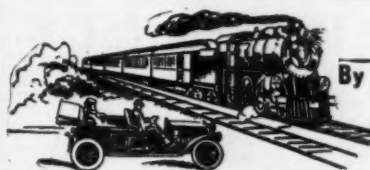
## J-M Dry Batteries Are Guaranteed

to give entire satisfaction. Your money back, including transportation charges, or new batteries, if they don't.

Write for Booklet

**H. W. JOHNS-MANVILLE CO.**

Albany, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Indianapolis, Kansas City, Los Angeles, Louisville, Milwaukee, Minneapolis, New Orleans, New York, Omaha, Philadelphia, Pittsburgh, San Francisco, Seattle, St. Louis, Syracuse



**SAVED!!!**

By the Gripping Power of  
**J-M Non-Burn Brake Lining**

A roar—a blur—and the limited is almost on top of you! Then is the time to thank your lucky stars that your brakes are lined with J-M Non-Burn.

It grips the drum instantly and brings your car to a quick stop. Never slips. Frictional heat cannot char it. And its gripping power is not impaired by water, oil or acid. Name on every piece. Sold by most dealers or shipped direct. Write nearest branch for sample and booklet.

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Baltimore	Cleveland	Los Angeles	New York	Seattle
Boston	Dallas	Louisville	Omaha	St. Louis
Buffalo	Detroit	Milwaukee	Philadelphia	Syracuse
Chicago	Indianapolis	Minneapolis	Pittsburgh	1949

## Dreadnought Moline M-40

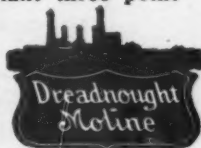
**\$1950**

Completely Equipped  
Electric Self-Starter  
Electric Lights



Five Passenger Touring Car. Full 40 H. P. Moline Long Stroke Motor. Unit Power Plant three point suspension—124-inch wheel base, top, windshield, speedometer. Send for printed matter.

**MOLINE AUTOMOBILE COMPANY**  
40 Keokuk Street East Moline, Ill.



Crank shaft is of large diameter—self-contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. Their extra large bearings reduce friction to a minimum—Increase durability and efficiency.

**Wisconsin Motors**  
ALL 4 CYCLE—5 TYPES

3 1/4-inch bore.....	5-inch stroke.....	4-cylinder
4 1/4-inch bore.....	5-inch stroke.....	4-cylinder
4 1/4-inch bore.....	5-inch stroke.....	6-cylinder
4 1/4-inch bore.....	5 1/2-inch stroke.....	4-cylinder
5 1/4-inch bore.....	7-inch stroke.....	4-cylinder

**WISCONSIN MOTOR MANUFACTURING COMPANY**  
Dept. 25, Milwaukee

## Simplicity, Strength, Durability—



## Three important points in Covert Transmissions

You would not think of putting an inferior motor in your car, would you? Superior transmissions are essential as the best motors.

**COVERT MOTOR VEHICLE CO.**

Sales Office: Ford Building, Detroit  
Factory: Lockport, N. Y.

## O. B. PORTABLE AIR COMPRESSOR

(Patents pending in all leading countries.)

No other air compressor is comparable with the O. B., considering its size, weight, price and portability. Needs no wiring or piping. Instantly available. Delivers an abundance of absolutely pure air, free from traces of oil or moisture, shocks or impulses. Two cents' worth of gasoline will inflate 50 tires—will inflate an average size tire to full pressure in 18 seconds.



No garage complete without one. Let us tell you more about this wonderful air compressor, and of our other types.

Write for prices.  
**UNIVERSAL MFG. CO.**  
Successors to Oscar M. Bergstrom  
308-310-312 Ninth St., So.  
MINNEAPOLIS, MINN.

## Braender Tires & Tubes are cheapest on mileage

They are strictly high-grade—built to outlast all others—and they do it. Ask any user.

Send for price list and full particulars  
Established Agents Solicited

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Salesrooms: 1987 Broadway, N. Y.  
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Bull Dog Non-Skid



## Specify "Gilbert"

on tire cases and get the best. Don't let your dealer substitute.

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New Haven, Conn.

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THE GOOD KIND



Figures show that VULCAN Springs last longer than the ordinary kind. Facts prove that they ride easier.

Stock on Hand to Fit:  
 Ford Overland Buick Reo Cadillac  
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**JENKINS MFG. COMPANY**  
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## DO YOU WANT SPRINGS THAT WILL NOT BREAK?



Cut shows **TITANIC SPRINGS** which have no hole to break at. If broken at center will replace and no questions asked.

FOR ANY CAR

We make also every pattern of **AUTOMOBILE SPRINGS**  
**TUTHILL SPRING COMPANY**  
 762 POLK STREET, CHICAGO

**The Official Car**  
 of the U. S. Government and the A. A. A. in their joint survey of  
**Three Transcontinental Routes**  
 in one season  
 in one car **The PATHFINDER 40**  
 Write today for 100 & 1 Reasons why the Pathfinder is the car you will buy.  
**The Motor Car Mfg. Co., Indianapolis, Ind.**



**THE THOROUGHbred CAR**

*Electric Self-cranking, Electrically Lighted  
 Four Forward Speeds*

"Six Thirty-six" Touring Car and Roadster, \$1850  
 Model 30 Touring Car..\$1350 Model 30 Roadster..\$1250

LIVE WIRE DEALERS  
 WRITE FOR UNALLOTTED TERRITORY

**HERRESHOFF MOTOR COMPANY**  
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KRUPP AUTOMOBILE CRANK SHAFTS, STEEL FORGINGS AND FRAME MEMBERS,  
 GEAR BLANKS, KRUPP BAR STEEL BALL MILLS, TUBE MILLS AND OTHER MACHINERY

KRUPP RESISTANCE WIRE



**Chrome  
 Nickel  
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Round Bars in Stock, having a Minimum Elastic Limit 95,000 lbs. per square inch. This steel can be Oil or Case Hardened so as to have an Elastic Limit of over 200,000 lbs.

Use this "TOUGHEST STUFF" and eliminate the Breakages you are now having

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GRILLED IRON L ROLLS

# FEDERAL TIRES

give "Extra Service"

Federal Rubber Mfg. Co. Milwaukee

THE CAR THAT CAPTURED FIFTH PLACE AT INDIANAPOLIS, MAY 30TH

Here is Model "NS"—Electric Starter, Electric head lights, side lights and tail lamp operated with generator and storage battery. 36 x 4 demountable rims with one extra rim, folding zig-zag wind shield, trip speedometer, aluminum adjustable ventilator in windshield base, robe rail, foot rail, tire irons, horn, pump, all tools, jack and tire repair outfit. Price \$1850. Send for dealers' proposition.

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**\$1850**

"Pass Them All"



**Motor Cars**

Send for Pleasure or Commercial Catalogue

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When Writing to Advertisers, Please Mention Motor Age.

## "Hyatt Quiet Bearings"



Hyatt Roller Bearing Co.  
Detroit, Mich.

## BOYER SUSPENSION BEARINGS

Perfectly combine the functions of both thrust and radial bearings  
**Transmit Most Power Because They Have Least Friction**

Users of Thrust Bearings will be interested in knowing that all of our Anti-Friction Bearings receive our own special grinding and heat treatment.

These costly processes ensure absolute trueness and exact density of steel with entire freedom from magnetic influences.

*Write today for our catalog*

**The Suspension Roller Bearing Co.**  
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Any Kind  
Every Kind  
Stock, or  
to Blue Print

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Clincher  
Q. D.  
Demountable  
Channels

For Automobiles, Motor Trucks  
Aeroplanes, Motorcycles, Bicycles

*We Also Make Axles and Hubs.*

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## FINISHED CRANK SHAFTS COMPLETE CONNECTING RODS COLD DRAWN STEEL SHAFTING

Screw Stock, Flats, Squares,  
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**FINISHED MACHINE KEYS - MACHINE RACK**

All material finished to a  
superior degree of accuracy

**STANDARD GAUGE STEEL CO.**  
BEAVER FALLS, PA.

## AUBURN 1913

*"Rides Like a Pullman—Pulls Like a Locomotive"*

38 Years' Manufacturing Experience  
Built Into Every Model.

Model 33M—Two Passenger  
Roadster; 33 H. P. long stroke  
motor  $3\frac{1}{2} \times 5\frac{1}{4}$  — Price, \$1150.

Model 33L—Five Passenger  
Touring Car; 33 H. P. long  
stroke motor  $3\frac{1}{2} \times 5\frac{1}{4}$  — Price,  
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Roadster; 40 H. P. long stroke  
motor  $4\frac{1}{2} \times 5$  — Price, \$1650.

Model Six—50—Six-Cylinder Touring Car, 50 H.P.  
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*Send for 1913 Catalog*

**AUBURN AUTOMOBILE COMPANY, Auburn, Ind.**

Model 40L—Five Passenger  
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Model Six—45B—Two Passen-  
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stroke motor  $3\frac{1}{2} \times 5\frac{1}{4}$  — Price,  
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Model Six—45—Five Passenger  
Touring Car, 45 H. P. long  
stroke motor  $3\frac{1}{2} \times 5\frac{1}{4}$  — Price,  
\$2000.

## WHERE'S YOUR "SIX" FOR 1913?

Every progressive manufacturer announces a "Six" for 1913. The supremacy of the "Six" is established. It has come to stay. Sooner or later you have got to add a "Six" to your line. Competition will force you to it. Why not now? Your 1913 "Six" at from \$1600 to \$2,000 will prove a self-seller if equipped with a

## Beaver "Six" Unit Power Plant

With cylinders  $3\frac{1}{2} \times 5$  inches this motor has the much desired long stroke and just the right power—40-45 H.P. Valves are extra large, and the enclosed valve action is noiseless. Transmission unit enclosed with motor has plate clutch and 3-speed forward selective sliding gear-set. Write for catalog of motors and prices.

**BEAVER MFG. COMPANY**

2800 First Avenue,

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### MANUFACTURERS OF AUTO PARTS

KINWOOD RADIATORS, FENDERS,  
KINWOOD OILERS, GASKETS,  
KINWOOD STEEL FRAMES,  
ETC., ETC.

### SPECIAL METAL STAMPINGS

## KLINE CAR

**"FIFTY"  
\$2585**

A Light Six with ample, but not extravagant power, in five body styles, with separate electric starting and lighting and separate ignition systems, and four speeds forward.

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**KLINE MOTOR CAR CORPORATION**  
RICHMOND, VA YORK, PA.  
MAIN OFFICE AND FACTORY, RICHMOND, VIRGINIA





## Borland Electrics

Agency territory is now being offered to those reputable and well-equipped dealers who are as particular about selling the best as we are about making it.

**The Borland-Grannis Co.**  
Executive offices  
and factory  
310 East Huron Street  
CHICAGO

## "Imperial Twelve" Garage Compressors

A high-class car equipment deserves high-class garage equipment. The quality of these little compressors is such as to appeal to the most discriminating buyers.

Booklet 608



**Ingersoll-Rand Company**  
New York London

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NOTE: COMPACT CONSTRUCTION OF DYNAMO AND COMPENSATIVE SIZE

Lights your lamps (without battery connection), charges your batteries, operates power-horn, inspection lamp, etc. A complete system—not a makeshift.

### Gray & Davis Products

Are supplanting oil and gas lamps wherever automobiles are used. Gray & Davis 6 Volt Electric Starter, Electric Lamps and Dynamo are Standard Equipment on America's leading cars.

**GRAY & DAVIS, Inc., 55 Lansdowne St., Boston, Mass.**  
Manufacturers of Automobile Lamps, Dynamos and Electric Starters




## Diamond SAFETY TREAD (Squeegee) TIRES

Won't Slip - Won't Slide  
Won't Skid - They Grip!

**THE DIAMOND RUBBER CO. OF N. Y.**  
Subsidiary of The B. F. Goodrich Co.  
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## The "INNERSHU"

A Tire Reinforcement that is **Guaranteed**  
Ask Any User



Made of the best, is the best, and recognized the country over as the one that makes good.

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## AJAX EXTRA HEAVY NON-SKID TIRES

The Only Non-Skid Tires  
Guaranteed for 5000 Miles

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## LIGHT OR WATER

We supply you with the one and save you the other. Ham's Truck and Pleasure Car Lamps are America's very best.



Our "Ideal" Carriage Washers and Automatic Water Savers save the water.

Ask Us About Them

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## BOYCE MOTOMETER PAT'S PEND'G

ADOPTED AS STANDARD EQUIPMENT  
by THE WEBB CO., ALLENTOWN, PA., for its entire output of motor fire apparatus. Other large makers plan to do likewise.

You too will recognize its merits the first time you watch the MOTOMETER operate. Read the radiator temperature right from the seats and avoid damage.



(Front View)

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1785 BROADWAY, N. Y.  
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(View from Seat)

**United States Tires**  
are good tires

*They cut down tire bills*

**UNIVERSAL JOINTS**  
"SPICER" MEANS QUALITY

"SPICER" on universal joints means quality, and "SPICER" quality has been a standard ever since universal joints have been manufactured.  
Let us quote you prices on your requirements.

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**Your Motor Car!**



Electric Starter  
Electric Lights  
Center Control  
Complete Equipment

**Nyberg** SIX \$2000  
FOUR \$1650

NYBERG AUTOMOBILE WORKS

Northern Factory: Anderson, Indiana  
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**THE KENTUCKY THOROUGHbred—"AMES 45"**


Long stroke, powerful Continental Motor—Electric (Dynamo) Lights—Self Starter—Left Hand Drive—Full Equipment—"Amesbilt" Bodies and Tops. A combination of power, speed, endurance and graceful lines. Price, fully equipped, \$1,635. This is 1913's most remarkable car value. Backed by a reputation of 30 years, it will win you from the first inspection. We have a most liberal proposition for good, live agents. Send for catalog today.

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THE MASTER CAR **FIAT** 15th YEAR

6 Cyl. 50 H. P. \$5000  
4 Cyl. 55 H. P. \$4500  
4 Cyl. 35 H. P. \$4000

**F. I. A. T.**  
POUGHKEEPSIE NEW YORK



To build up and increase future business, you should sell a truck that is


**Durable, Economical, Neat in Design**  
and will satisfy your customer.

The performance of our truck will bring you easy sales. It is only a matter to put one in service and you will not worry about competition.

A card will bring you details

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Economy is too big a matter to be found lurking in cheap prices.



**NON-FLUID OIL**

Costs more than other lubricants for bearings and gears but its use reveals true Economy in dollars saved on repairs and in Efficiency retained in your car.

**NEW YORK & NEW JERSEY LUBRICANT CO.**  
165 Broadway, New York  
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**LAUTH-JUERGENS**

**One, Two, Three and  
=Five Ton Trucks=**

"Guaranteed for Life"  
"Guaranteed Service"

**The Lauth-Juergens Motor Car Company, Fremont, Ohio**



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ASBESTOS FRICTION

## FOR BRAKES AND CLUTCHES

Over 1,000,000 feet of material produced by our PATENTED PROCESS in daily use.

High coefficient of friction gives greatest factor of safety in operation of all brakes and clutches and OUR PATENTED PROCESS produces the only HIGH-FRICTION facing.

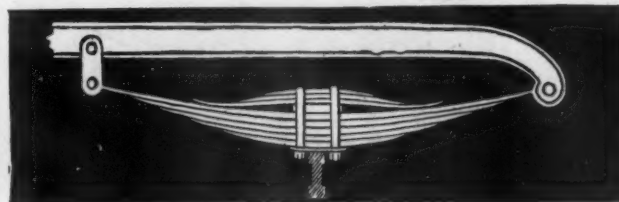
THIS MATERIAL gives better satisfaction and wears longer than any other facing and is especially adapted for manufacturers' use; our BAND linings, as well as RINGS and CONES for CLUTCHES, being formed ACCURATELY to shape and size.

**F. L. Horton Mfg. Co.**  
36 Whittier Street, Boston, Mass.



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ACTS ONLY ON THE RECOIL

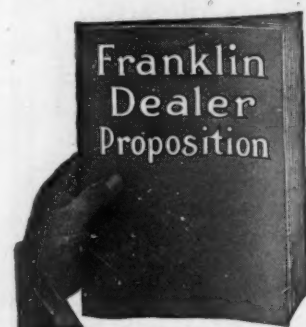


Prevents broken springs due to recoil. Eliminates vibration. A logical device giving real efficiency.

**CLARENCE N. PEACOCK & CO.**

1784 Broadway Exclusive Licensees New York City

## Write For This Franklin Dealer Proposition



**F**RANKLIN six-cylinder models now equipped with Entz Electric Starting and Lighting. A real self starter with original features. Franklin cars use less gasoline, less oil, no smoke, fewer tires, travels faster, rides easier, silent, powerful, flexible, beautiful. Get the Proposition.

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**"OLYMPIC"**  
\$1500  
4 cylinders

**"MAJESTIC"**  
\$1975  
4 cylinders

**"SULTANIC"**  
\$2650  
6 cylinders

**JACKSON AUTOMOBILE CO.**  
EAST MAIN STREET,  
JACKSON, MICHIGAN.

*Jackson*

NO HILL TOO STEEP  
NO SAND TOO DEEP

*Imperial*

## INVESTIGATE These Five Great Cars NOW

Imperial Offers Unusual Values for 1913

MODEL 32.....\$1285	MODEL 33.....\$1285
MODEL 34.....\$1650	MODEL 44.....\$1875
MODEL "SIX"—60.....\$2500	

Supreme in Beauty and in Constructional Merits

Imperial Automobile Co., Jackson, Mich.



## THE LIFE OF YOUR CAR

Barring accidents, depends upon the thoroughness of its lubrication and the quality of lubricant used.

## DIXON'S MOTOR GRAPHITE AND GRAPHITE GREASES

Are prepared with the idea of furnishing the best lubricant for every motor bearing—for no one lubricant is the best for every purpose. Write for "Lubricating The Motor," No. 82—a book which tells you what lubricants to use in every bearing to get the longest life and most mileage out of your car. State make, model and year of your car.

**JOSEPH DIXON CRUCIBLE CO.**

Jersey City Established 1827 New Jersey

## Have You Read This Week's Classified Columns?

They contain numerous advertisements of interest to you.

It makes no difference what you are looking for—whether a factory superintendent, salesman, foreman or chauffeur—you will find the man listed in MOTOR AGE classified columns.

# LOZIER

## A LOZIER FOR \$3,250! (A Self-Seller)

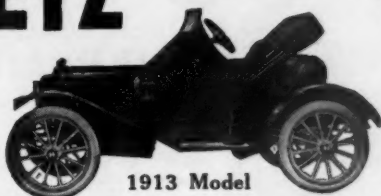
A completely equipped Light Six which will meet the big demand for a really high-class car of this type. Dealers from coast to coast who have investigated the LOZIER "Self-Seller" say it is the greatest motor car value they have ever seen.

Some good territory is still open

Write or wire for our proposition

LOZIER MOTOR CO., DETROIT

## METZ "SPECIAL" \$445



1913 Model

COMPLETELY  
EQUIPPED

LEFT-HAND DRIVE  
CENTER CONTROL

22½ H. P., 4-cylinder water-cooled motor, Bosch magneto, standard artillery wheels, best quality 30"x3" clincher tires, extension top, wind shield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gal. of gasoline. A thoroughly practical, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory.

Send for Book "K."

METZ COMPANY, Waltham, Mass., U.S.A.

## Hupmobile

"32" Touring Car .....	\$1000
6-Passenger Touring Car .....	1200
"32" Roadster .....	1000
"32" Covered Delivery .....	1100
20 H. P. Runabout .....	750

All Models F. O. B. Detroit. Fully Equipped.

Literature sent upon request

HUPP MOTOR CAR COMPANY  
1228 Milwaukee Avenue Detroit, Mich.

## THE MAYER CARBURETOR

Gives the motor the right mixture at varying speeds, is the most economical, reducing gasoline expense a full 25 percent. And with the MAYER you can get from 15 to 30 percent more power from your motor than with 90 percent of the other carburetors on the market.

Write for catalogue No. 20E and learn the merits of the MAYER

MAYER CARBURETOR COMPANY  
2673 Main Street, Buffalo, N. Y.

## GOODYEAR

AKRON, OHIO

This name on Automobile Tires and Rubber Accessories signifies inherent qualities of material and workmanship that insure the maximum of service at the minimum of expense. (673)

THE GOODYEAR TIRE & RUBBER CO.  
AKRON, OHIO

## I Want You to HEAR This Musical Auto Horn



I know there isn't anybody who can describe the chime-like signal of the Aermore Horn to you. So I want you to hear it—

The **AERMORE**  
Exhaust Horn  
—the horn harmonious

I want you to write me and I'll tell you where and how you can hear the singing, organ-like tones of the Aermore. Just drop me a postal.

G. V. P. Lansing, President.

Patented  
Jan. 23, '13.  
Aug. 20, '12

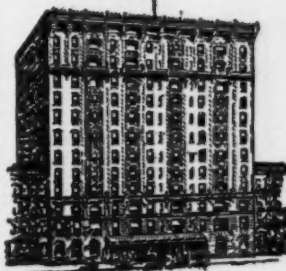
AERMORE MANUFACTURING COMPANY  
Dept. 5878, 1536 Michigan Blvd. CHICAGO, U. S. A.

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Walk  
From  
There  
to  
Any-  
where.

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The Hotel  
of Comfort

43rd St., Just East of Broadway, New York



Our new addition is ready for occupancy. We now have 360 rooms with 265 baths. Write us for descriptive folder with typical floor plan and rate card. Wire for reservation at our expense.

Rates  
From \$2.50 to \$4.00 Per Day  
W. H. VALIQUETTE  
MANAGER  
Also The Berwick, Rutland, Vt.

## STAR BALL RETAINERS

STAR BALL RETAINERS are famous wherever ball bearings are known. The best bearing service attends the car equipped with STAR BALL RETAINERS. We also manufacture more thrust bearings than any concern on the market. Send us your requirements.

THE STAR BALL RETAINER CO.  
LANCASTER, PA.



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## AXLES WHEELS TRANSMISSIONS

W & S Salisbury Wheel & Mfg. Co. W & S  
JAMESTOWN, N.Y.

For three years, the standard equipment for most of the leading cars, the

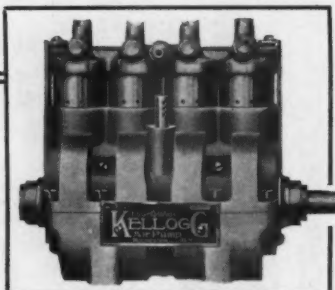
**KELLOGG**  
Four Cylinder  
Air Pump

pumps only clean, free air to any desired pressure and inflates the largest tires in less than three minutes.

Attachments are ready for the HUDSON "33"—"37"—"54."

Ask your agent or write us

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43 Circle Street Rochester, N. Y.



## Detroit Demountable Rims



**"Positive"**

Absolutely self-centering, and held so by V-blocks on felloe band and on rim.

**DETROIT DEMOUNTABLE RIM CO.**  
247 Jefferson Avenue DETROIT, MICH.

## The Pilot "THE CAR AHEAD"

Three Great Models: Pilot 40—Four cylinders, 4½x5; brake test, 55 horse-power; 120" wheel base; price, \$2000. Pilot 50—Four cylinders, 4½x6; brake test, 59 horse-power; 126" wheel base; price, \$2250. Pilot 60—Six cylinder, 4x6; brake test, 67 horse-power; 132" wheel base; price, \$2500.

**The Car Without a Mechanical Defect**

Testor "T" head motors, full floating rear axles, Brown-Lipe differential, Warner transmission, Elsemann magneto, Stromberg carburetor, handsome jewel bodies with ventilating windshield. Completely equipped, with every convenience and comfort. Dynamo electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States.

Write for our beautiful art book showing cars in detail  
**PILOT CAR SALES COMPANY,** Richmond, Indiana

## The Crowe Non-Adjustable MASTER VIBRATOR FOR FORD CARS

Here's something new—A vibrator that NEVER needs adjustment—that's ALWAYS right under ALL conditions.

Gives a quick hot spark absolutely uniform in all cylinders. Eliminates missing and late sparks.

Makes your engine start easier, run smoother, pull steadier and DEVELOP MORE POWER.

Ends all vibrator troubles.

Works on magneto or battery current. GUARANTEED SUPERIOR to all high-priced adjustable vibrators.

Measures only 2¼" in diameter. Neat in appearance.

Price, Only \$10.50

Sold by garages and accessory dealers everywhere or sent prepaid on receipt of price.

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Backed by 15 years of specialization. Found on more high-grade cars than all other makes of lamps.

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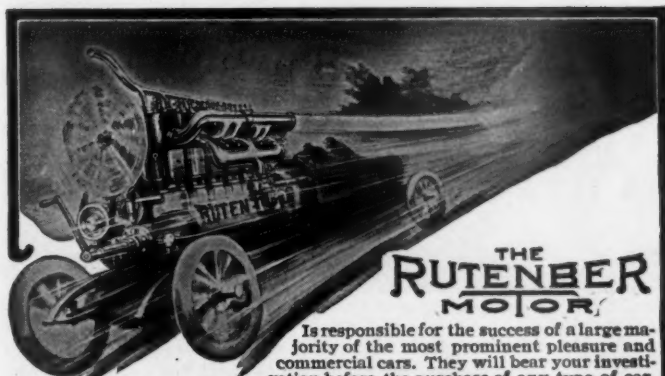
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The only demountable rims that positively prevent tire wobbling. No special tools needed for operation. No unnecessary loose parts. Detaching feature independent of demounting mechanism. Will accept either straight side or clincher tires. Used as standard equipment on America's finest cars.

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**RUTENEBER MOTOR CO., Marion, Indiana**

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**Mosler Spit Fire Plugs**  
are the BEST

FOR 13 YEARS HAVE BEEN LIKE THIS

INSIST ON OUR  
GENUINE PLATINUM POINTED PLUGS

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*If you are not satisfied with the mileage your present tires are giving you, go to our nearest branch agent and ask him to show you why Republic Staggard tread tires will give you the mileage you ought to get.*

*The Republic Rubber Co. - Juncosham, O.*

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You have seen it—and admired it. Probably you did not know that it was a Robbins body. Probably you have wondered whose design and construction produced that handsome Sedan.

For your own comfort, you will need a Sedan body this winter.

LET US DESIGN IT

**IRVIN ROBBINS & COMPANY**

Address Sedan Dept. 10th and Canal, Indianapolis, Ind.



**SKID BLOWOUTS RIMCUTS PUNCTURES WEARING OFF OF RUBBER MIT**

Each section 2 in. wide. They hook to rims. Try two or three sections over any old blowout. Special prices to the first in new territory

**KIMBALL TIRE CASE CO., 173 BVD., COUNCIL BLUFFS, IA.**

**Cut Gears of Quality Complete Differentials**

The  
**NEW PROCESS GEAR CORPORATION**  
SYRACUSE, N. Y.



**The Brake Lining of QUALITY**  
Safest—Surest Best Wearing

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Sales to the Dealer  
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Write for booklet

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**STRENGTH** from Chrome Vanadium Steel costing us many times ordinary steel prices; oil tempered, not merely flashed in oil or chilled in water, the old wrong way for tempering. Tested physically to withstand 40 tons to the square inch without taking a permanent set, there is no equal to

**Cleveland-Canton "Chrome Vanadium" Automobile Springs**

Combine flexibility and strength to best meet all strains, jars or vibration from load, road, or engine. For Motor Trucks, Tractor Engines, Auto Cabs and all Motor Vehicles. Give Longest Service and

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Best Grade: "Chrome Vanadium." Next Best: "Special Analysis."

**THE CLEVELAND-CANTON SPRING CO., Canton, Ohio**



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R**We Specialize in High-grade  
Automobile Parts**

Transmissions  
Steering Gears  
Gear Shift Levers  
Differentials  
Electric Starters

**The Warner Manufacturing Co.**  
TOLEDO, O.

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You can take a thousand miles of service out of a set of tires by driving them insufficiently inflated over ten miles of road.

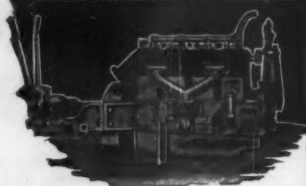
*Use the New Positive Lock Stop*  
**TWICHELL AIR GAUGE**  
and save your tires



**"TIRE INSURANCE FOR \$1.00"**

Simple, Accurate, Durable and Easily Read  
For sale by Jobbers, Dealers, Garages, or

**The Twichell Gauge Co.**  
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**Model  
Motors**

Afford the utmost in reliability and power—with the least weight and fuel consumption. You can add much value to your car by using the Model Motor. We make them better and at less cost than you can, because we specialize in motors and power units. Write us for facts.

**Model Gas Engine Works**  
PERU, INDIANA

**Look At Our New Middle Name**

**PENNSYLVANIA  
Oilproof  
VACUUM CUP TIRES**

**Pennsylvania Rubber Company**  
JEANNETTE, PA.  
Branches—Coast to Coast

**HESS AXLES**

¶ HESS Axles have been on the market but 2 years. Fourteen car manufacturers in that short time exclusively adopted them as regular equipment.

¶ Renewals of HESS contracts for 1913 from past users and an increasing HESS demand among new manufacturers, is ample proof of the stability of HESS Quality.

¶ May we be of service to you? Write us.

**THE HESS SPRING & AXLE COMPANY**  
CARTHAGE, OHIO, U. S. A.

**BLACK EAGLE  
Spark Plug**

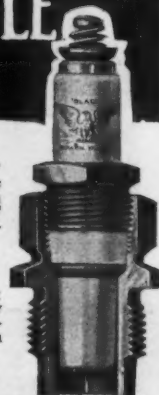
**50c. IS ENOUGH**

The "Black Eagle" Spark Plug marks the dawn of a new era. From now on The Price of Spark Plugs will gravitate to Fifty Cents.

**Why not be a pioneer in your territory?**

The reason is apparent—none better at any price. Made in all standard threads mailed upon receipt of price.

**THE STANDARD CO.**  
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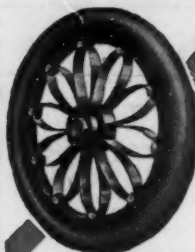


**Great Western**

**FORTY  
1913 FULLY \$1585  
EQUIPPED**

**LUXURY — POWER  
ABSOLUTE SILENCE**

WRITE FOR OUR NEW CATALOGUE  
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*"It's in the Spokes"*

**Eliminate  
Your Tire Trouble**

You can have the same riding comfort in your electric as you have now and without the constant dread of punctures and blowouts, by using

**Ideal Steel Wheels**  
(Resilient)

Equipped with solid rubber tires they make any car ride as easily as wooden wheels and pneumatic tires. The shocks are absorbed through a series of elliptical spokes of chrome vanadium steel.

Guaranteed to double the life of any tire, pneumatic or solid. Furnished for any motor driven vehicle. *Write for literature today*  
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"The Easiest Riding Car in The World"

## Marmon "32"

Four cylinders, 32-40 h. p., 120-inch wheel-base, electric starting and lighting system, left-hand drive, center control, nickel trimmings, with newest body types to meet every requirement and corresponding equipment.

\$2,850 to \$4,100

## Marmon "48"

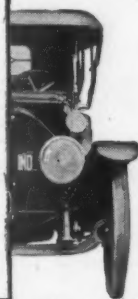
Six cylinders, 48-80 h. p., 145-inch wheel-base, electric starting and lighting system, left-hand drive, center control, nickel trimmings, with body types to meet every requirement and corresponding equipment.

\$5,000 to \$6,350

Detailed Information on Request

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Indianapolis (Established 1851) Indiana

"Sixty Years of Successful Manufacturing"



## HENDERSON

"The Car of Your Dreams"

### Six Models

\$1,285 to \$1,685



HERE is truly a car of today. Such features as Ward Leonard Electric Self-Starter, Dynamo Electric Lights, Single Lever Center Control, Left Side Drive and Gasoline Tank Under Cowl, are all built into the car. They are not "afterthoughts"—tacked on. Henderson Wire Wheel models are designed with special hubs making them interchangeable with wood wheels. The automobile buying public is not slow to appreciate such cars at such prices. This is evidenced by our dealers everywhere.

Some territory still open—write for terms.

**Henderson Motor Car Co.**  
of Indianapolis, U. S. A.

## Inter-State

MODEL 45, \$2750

6 Cylinder, Left-hand Drive,  
Center Control,  
132-inch Wheel Base.

**INTER-STATE AUTOMOBILE CO.**  
MUNCIE, INDIANA



Patented

**Manufacturers of 1913 Models:** Don't omit a SPARKS-WITHINGTON Fan from your 1913 specifications. Our One-Piece blade, ball-bearing, radiator fan assemblies cool the motors of more high-class cars than any other fan on the market. There's a reason. SPARKS-WITHINGTON Fans deliver the greatest volume of air with the least H. P. consumption of any fan obtainable. Furthermore, their one-piece construction is positive insurance against blades which loosen, become detached and fly off. Undoubtedly one of our ten standard models is just what you have been looking for. Catalogue and detailed blue-prints on request. Get in touch with us.

**The Sparks-Withington Co.**  
JACKSON MICHIGAN - WALKERVILLE CAN.

The **U-S-L Electric Starter & Lighter** takes the place of the fly-wheel.

The **U-S-L Storage Battery** (vehicle type) insures lively electric cars and powerful and economical trucks.

The **U-S-L Storage Battery** (sparker type) means a never failing spark for engine ignition.

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"Always There"

SPLITDORF "TS" COILS are the newest and most serviceable transformers on the market today. Equally effective with the older as well as the latest SPLITDORF magnetos, the "TS" COILS can be relied upon at all times.

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## Air Compressors

For Private and Public  
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Single and Double  
Cylinders

Air and Water Cooled Types

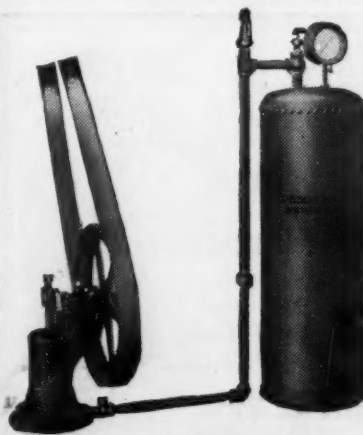
**Jacobson Machine**

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### PLEASURE CARS.

Model 29—Runabout.....\$2,600

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### TRUCKS.

2,000-lb. Chassis.....\$2,200

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Correspondence with dealers solicited

When Writing to Advertisers, Please Mention Motor Age.



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### THE PROFIT MAKING PLANTS



The vulcanizing system that DOES NOT use air bags. SOLID PADS and HEAVY CLAMPS are the means through which pressure is generated.

Plants from  
\$25 to \$500

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## Marathon Automobiles

America's most comprehensive line. Every car completely equipped. 3 sizes chassis—10 body styles. Price range from \$875 to \$1800

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MARATHON MOTOR WORKS, Nashville, Tenn.



FOR

All Makes of Cars

All Kinds of Weather

All Grades of Gasoline

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## Has Always Led

Ask us to tell you about the wonderful new pole pieces and the Automatic Control Magneto.

## THE EISEMANN MAGNETO COMPANY

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**Wasting Tire Money** That's what you're doing when you allow water and sand to work into the fabric through small cuts and bruises, rotting them and causing blow-outs.

## THE GIBNEY Eleck-Trick Vulcanizer

seals these cuts and makes tubes and tires run double and treble the usual time

Easy to Operate—It Operates Itself

An illustrated book, telling how to double the life of your tires, awaits your request for it.

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GAS, OIL, AND ELECTRIC

CORCORAN LAMP CO.  
CINCINNATI, O.

## The Searchlight Gas Co.

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Stronger than ever, legally, financially and in the esteem of the trade. Watch us grow.

### BRANCHES AND REFILLING STATIONS:

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## Michener's Chain Carbon Remover



Pat. April 2, 1912.

This carbon remover is a small, flexible chain, made of tough soft wire, 90% copper, manufactured especially for this device; is as flexible as a piece of twine and I guarantee it absolutely harmless to the motor.

This device saves the expense of tearing down the motor, eliminates disturbing the bearings and adjustments which are difficult to secure again; does not scratch or nick the cylinders which a sharp edge tool is likely to do in the old hand scraping way.

Has had the most wonderful sale of any accessory on the market the past three years and steadily increasing.

Recommended by manufacturers and garages. Get two to clean your motor quickly—you can clean two cylinders at one time. State kind of motor when ordering.

Price 75c; 3 for \$2.00

Get them from your Dealer

Now sold everywhere

Or if your dealer cannot supply you I will send direct, postpaid.

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CAN BE HANDLED BY ONE PERSON AS EASILY & QUICKLY AS AN UMBRELLA  
INSTANTANEOUS PROTECTION  
GOLDE-PATENT MANUFACTURING CO. 513 W. 56th ST. NEW YORK.



**The New Swinehart**  
**KEATON NON-SKID TREAD**  
has four times the wearing service of the ordinary non-skid. Users will tell you that they have run Swinehart Keaton Non-Skid Tread Tires a whole season without having them lose their anti-skid effectiveness. Call at any one of our stores and investigate them. We also make a complete line of Smooth Pneumatic Tires of best quality. Branches and distributing agencies in all leading cities.  
**SWINEHART TIRE & RUBBER COMPANY**  
1306 North St., Akron, Ohio



Type 35  
Series  
G and H

Electric  
Starting  
and  
Lighting

**MERCER THE CHAMPION LIGHT CAR**

When motor car efficiency, power, durability, and speed are mentioned, all eyes focus on the Mercer.

*Descriptive literature sent on request*

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**SCHAFER BALL BEARINGS**  
MADE IN GERMANY SOLD IN AMERICA



When you buy SCHAFER BALL BEARINGS you are not experimenting because SCHAFER BALL BEARINGS have for years been recognized as the standard of bearing quality. They are made in Germany of the best steel, and are now in universal use throughout the world.

**BARTHEL & DALY**

42 BROADWAY

NEW YORK

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NEW YORK  
1710-1718  
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NEW CARS  
USED CARS  
MOTORS  
BODIES  
TOPS AND  
EVERY  
ACCESSORY  
FOR THE  
AUTOMOBILE

From 20c to 50c  
on the dollar

We are the  
Largest Dealers in the  
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in  
New & Used Cars  
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Factory Cleanups




**Model 5-A \$1700**  
**Touring Car Fully Equipped**  
People who demand POWER, ENDURANCE, LUXURY and SAFETY in a motor car, drive the time-tested GEARLESS TRANSMISSION CARTER CAR. Presented in four excellent models \$1600 to \$2000.

**Electric Cranking and Lighting**

**Cateccar Company, Pontiac, Michigan**  
Branches: New York, Detroit, Chicago, Kansas City, Atlanta

**Dorris**  
*Built to Last*



**THE SILENT CAR**  
**BUILT TO LAST**

Our agency proposition will interest you. Write for it.

**DORRIS MOTOR CAR COMPANY**  
100 S. Sarah Street St. Louis, Mo.

Get acquainted with the  
standardized "Cole"

the car that is writing gasoline history.  
Learn what the

**Cole franchise for  
dealers**



will mean to you if you happen to be  
located in open territory.

**Cole Motor Car Co. of Indianapolis**



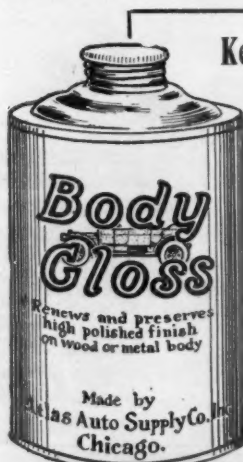
## Prest-O-Starter

*Starts your motor, old or new, with utmost ease*

This simple, efficient gas starter costs little to install and operate. Unlike some starters, it *works* in winter as well as summer.

Write for literature

**THE PREST-O-LITE CO.** 233 East South St., Indianapolis, Ind.  
CANADIAN MAIN OFFICE AND FACTORY, MERRITTON, ONT.



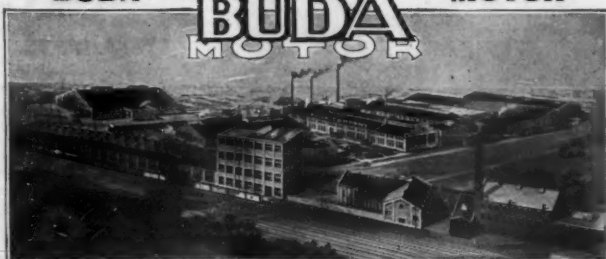
### Keep Your Car Looking Like New

An hour's easy work once a month keeps a car shining and new looking. Body Gloss is a wonderful varnish renewer. The only perfect refinisher. Easy to apply. Simply pour on cloth and rub on. Finish with dry cloth. Economical. A pint goes over any touring car twice. BODY-GLOSS will not restore the factory finish to a body that needs painting. But its use will preserve for an indefinite period the original luster of a well finished car. Use BODY-GLOSS and your new car will *always* look new.

At your dealer's or sent express prepaid upon receipt of price. Pint can, 75 cents; quart can, \$1.25. Money back if not satisfied.

ATLAS AUTO SUPPLY COMPANY, 3243 W. LAKE ST., CHICAGO

**HERE IS THE FACTORY BEHIND THE "BUDA" MOTOR**



**AND HERE'S THE FACT: THE BUDA IS "THE PART THAT SELLS THE CAR"**

We are constantly adding standard makes to our list of customers. When may we show YOU the reasons WHY?

**BRANDENBURG & CO.**

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CHICAGO, ILL.

57TH AND BROADWAY  
NEW YORK, N. Y.

FORD BUILDING  
DETROIT, MICH.

# SHELDON

**AXLES & SPRINGS  
ARE  
INVINCIBLE**

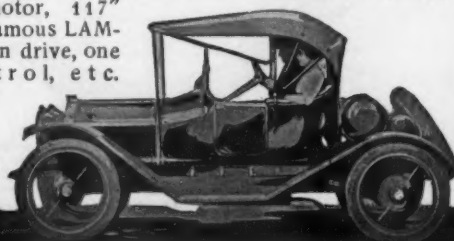
**THE SHELDON AXLE CO.**  
WILKES-BARRE, PA.  
CHICAGO OFFICE: 68 East 12th Street.  
DETROIT OFFICE: 1215 Woodward Ave.

## The LAMBERT

The LAMBERT Model 99 (5-passenger touring car or 2-passenger roadster) at \$1365 (fully equipped) stands at the head of its price class. It comprises 4 1/2 x 5 1/4

at the head of its price class. Rutenber motor, 117" wheelbase, famous LAMBERT friction drive, one lever control, etc. Write for catalog.

BUCKEYE MFG. CO.  
ANDERSON, IND.



MODEL 99 2 PASSENGER ROADSTER

### NOTICE

## "Thomas Car" Owners

The service department and the repair-parts department of the E. R. Thomas Motor Car Company have been purchased by C. A. Finnegan, Buffalo, N. Y. These departments will be continued in full operation at the old address, 1200 Niagara Street, Buffalo, N. Y. All orders for

### Parts and Repairing

will receive careful and prompt attention.

### Save This Notice

This advertisement will NOT appear again. Either make a permanent note of the address or save the whole notice.

Address all communications and requests to

**E. R. THOMAS  
MOTOR CAR CO.**  
1200 Niagara St.  
BUFFALO, N. Y.

## RUDGE-WHITWORTH DETACHABLE WIRE WHEELS

**Fitted With HOUK Quick  
Detachable Rims**

Make for greater resiliency, smoother riding. Save tires. Are quickly and easily removed. Practically indestructible. Absolutely rust-proof. Now being manufactured in America by the Standard Roller Bearing Company, of Philadelphia.

**GEO. W. HOUK CO.**  
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## Weed Chains

**Absolutely Prevent Skidding**

**Necessary on Rear Wheels  
Advisable on Front Wheels**

For your own safety—for the safety of the public, fully equip your car with Weed Chains

AT ALL DEALERS

**Weed Chain Tire Grip Co.**

28 Moore St.

New York

## We Ship On Approval

### PREPAY EXPRESS AND ALLOW 30 Days' Free Trial

The best "Nonskid" puncture-proof device for automobiles, commercial cars and motorcycles.

### Try Them At Our Expense

Be your own judge—don't take any one's word for it. "The proof of the pudding is in the eating."

Perfect Score in 4 Glidden Tours

Twin Cities to Fargo, N. D., 1909.  
Twin Cities to Helena, Mont., 1911.  
New York City to Jacksonville, Fla., 1911.  
Twin Cities to Winnipeg, 1912.

It only costs one cent to learn our prices and guarantee on "Bricton" Detachable Treads.

Write Today for Full Particulars

**The Bricton Mfg. Co.**

BROOKINGS, S. D.

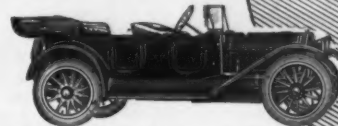


The 6-Cylinder, Reasonably Priced

**de Soto Six** 55 H.P.

The car with a stronger appeal than any recent product of the trade—the one that meets a popular demand. We have an unusually attractive proposition for dealers. Write at once for free catalog and full particulars.

Sells for  
**\$2,185**



de Soto Motor Car Company, Auburn, Ind.

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Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 35 horsepower four-cylinder car of modern refinements priced at only \$1095.

**R. M. OWEN & CO., General Sales Agents**  
**REO MOTOR CAR CO., LANSING, MICH.**

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### Electric Lighted **SIX** Self Starting

SERIES "S"—45 H. P., 2, 4 and 5 Pass.—\$2,300  
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SERIES "M"—60 H. P., 2, 4, 5 and 7 Pass.—\$2,750

New Six Passenger, Coupe and Limousine  
Bodies slightly higher.

TERRITORY OPEN FOR PROGRESSIVE DEALERS

Pioneer Six-Cylinder Car Builders of America

**McFARLAN MOTOR CAR CO., Connersville, Ind.**

No Automobile is Completely  
Equipped without it.

### The Stewart Piston Gasoline Saver

Saves up to 40%

(20% Guaranteed)

INCREASES POWER INCREASES SPEED  
SAVES YOUR BRAKES

Price **\$6.50** Anywhere in the U. S.  
Ask your dealer, or  
write us.

**HALLIWELL CO.**

408 West Pico Street, Los Angeles, Calif.



### GET Acquainted WITH EAGLEINE NO-KARBON OIL

EAGLEINE NO-KARBON OIL possesses less than one-half the carbon and other impurities contained in all other cylinder oils. It's a lubricating wonder. Its use means a clean motor.

**EAGLE OIL & SUPPLY CO.**  
104 BROAD ST., BOSTON.  
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A Directory for the Guidance of Motor Age Readers



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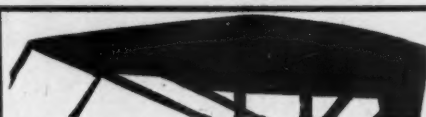


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Stearns 30-60, shaft drive, seven passenger touring car. Equipped with Republic Staggard Tread tires, two extra tires, demountable rims, top, wind shield, speedometer, seat covers, extra seats, complete set of lamps, Prest-O-Lite tank, tools, etc. The entire outfit in excellent condition in every respect. The body is a special one built by Brewster of New York. This is one of the best values for the money to be found anywhere. Packard Motor Car Co., 2359 Michigan Ave., Chicago.

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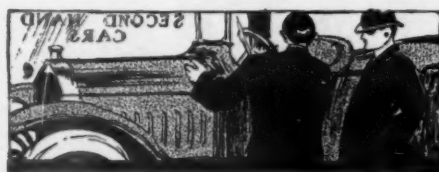
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models, in excellent condition; also parts for steamer engines and generators. We specialize in steamers. Joseph Libal, 3145-53 N. Halsted St., Chicago.

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batteries. Exide, Vesta, National, Universal, for auto igniting and lighting, \$1.50 to \$7.50. 4105 Cottage Grove Ave., Chicago. a



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Cylinder Reco Parts, which we offer at a discount of 40% from factory list on business amounting to \$20.00 or more. Address Box D 279, c/o Motor Age.

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Something new and novel. Gives an abrupt loud noise surpassing anything now on the market at a price within reason. Write for descriptive circular. Buell Auto Co., 6051 Cottage Grove Ave., Chicago.

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Foredoors for open-front cars.

Write for prices.

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THESE BARGAIN PRICES WILL HOLD  
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Our 1913 catalogue will be out in two weeks.

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Send for our No. 700 Bargain Sheet.

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In equipment for 4 and 5 pass. cars

	Reg. Price	Our Price
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Each article sold at our special list price, or a combination of four items, with choice of lighting system, for.....		
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Bargain equipment for all cars.		

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One piece aluminum; immediate shipment subject to inspection.  
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**GUARANTEED.**

Radiators for all cars.

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Buick B-K-S-33-39.....	42.50
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Look for them

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Write for our parts list; save you 1/2 on repair parts.

Autoparts Mfg. Co., Cor. Trombley and Orleans, Detroit, Mich.

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Apply Boyer's Automatic Re-Finisher to your Automobile today. Tomorrow it will look as though it just came from the factory. Finest thing in the world for dull hoods. One application lasts a year.

Particulars free.

Boyer Chemical Laboratory Co., 2 E. Michigan St., Chicago.

**LATEST FORD TOURING CAR BODY,** \$90.00. Latest Ford roadster body, \$35.00. Tops, curtains included. Box D 303, c/o Motor Age. r

**KASTNER TIRE AND RIM CO.,**

2112 Michigan Ave., Chicago. Standard Universal, quick detachable rims in sizes 30x3, 34x3 1/2, 32x4 at \$5.00 a set of four, absolutely new. Also 30x3 one-piece clincher rims at 50 cents each. Send for cut of quick detachable rim and our new rims part catalogue.

**KEROSENE FOR AUTOMOBILES**

Our new Model B uses successfully half and half mixture lowest grades kerosene and gasoline. Satisfaction guaranteed or money refunded. Greatly increased power; very slow speed on high. Starts easy at zero. Special agents' prices. Dept. B, The Air-Friction Carburetor Co., Dayton, Ohio.

**LIGHT—ANYONE USING ACETYLENE,**

either generator or gas tank, should attach a White Light Gas Refiner to same. It will eliminate all trouble and increase brilliancy of lights by removing all acetone, water and dust from gas. Price, \$1.50, complete. Write for circular.

BARNARD BRASS WORKS, Rockford, Ill.

**LIMOUSINE BODY — 7-SEATED; HAND-**buffed leather cushions; complete; nearly new. Cincinnati Hide and Leather Co., Station B, Cincinnati, Ohio.

**MACHINE SHOPS AND GARAGE—OUR**

**WELD IT ALL** machines will weld perfectly any broken casting that has a melting point. Full particulars on Oxy-Acetylene welding machines sent on receipt of your address. Every machine fully guaranteed. H. D. Prose & Co., Wichita, Kansas.

**MAKE YOUR DOLLARS HAVE CENTS.**

\$150.00 rear axles.....\$45.50  
50.00 windshields.....10.00  
Wheel.....2.50  
Transmission and clutch, cost \$200, sell 75.00  
Silk Mohair tops, complete, each.....10.00

Send for real bargain list.

Puritan Machine Co.,

51 Tenth St., Detroit, Mich.

**MAXWELL PUSH ROD ADJUSTERS**

\$1.50 for complete set delivered. Money back guarantee. Auto Parts Co., Providence, R. I.

**MORA REPAIR PARTS**

We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

**MR. (FORD) OWNER AND GARAGE MAN**

—The Townsman Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price \$1.50 by mail. Ask your jobber, or address Townsman Auto Specialty Co., Mitchell, S. D.

**NEW 4 CYLINDER MOTORS 20-22 H. P.** CYLINDERS CAST IN PAIRS; 3 1/2" BORE, 4" STROKE, AT \$75.00 EACH. BLUE PRINT ON REQUEST. ADDRESS BOX D 320, C/O MOTOR AGE. k

**NICKEL PLATE YOUR AUTO TRIMMINGS** with Electro-Knickel. Prevents brass from tarnishing, iron from rusting. This is not a silver or mercury wash. We guarantee it plates (without a battery). Price \$1.00, express prepaid. Write for information. Gun Metal Finish Co., 313 Powers Block, Decatur, Ill.

**NEW AUTO PARTS FOR SALE.**

Frames 112-124" W. B. straight and kickup.....\$10.00 \$15.00  
Unassembled 112" W. B. kickup frames.....10.00  
Wheels 32x3 1/2 and 34x3 1/2, per set.....12.00 14.00  
Also Lot of Odd Sizes  
Axles, 30-50 h. p.....\$40.00 \$60.00  
Radiators, honey comb, each...15.00  
Sixty new Mufflers at half price.  
A Few Used Atwater Kents  
5 pass., open type, bodies in lead, each.....\$10.00  
Running board brackets, spring clips, spring hangers, etc.; tell us what you need, we may have it. Address Box D 324, c/o Motor Age. j



## NOTICE CLARK CAR OWNERS.

We have a full line of repair parts for all models of Clark Cars.

Write us for low prices on tires.

Clark-Moody Automobile Co.,  
Anderson, Indiana.

**ONE E. U. J. H. T. EISEMANN MAG-**  
neto .....\$30.00  
Model B, No. 5 Stromberg Carburetor.. 12.00  
Model D, No. 4 H. T. Bosch Magneto.. 40.00  
Six 4-cylinder, 4-cycle, 45 h. p. Mil-  
waukee motors, each.....125.00  
Auto Salvage & Parts House,  
1436 Wabash Ave.,  
Chicago.

**OXY - ACETYLENE WELDING PLANTS.**  
The Admiral Welding Machine is the ideal welding device; large capacity; self-generating throughout; portable; complete in every detail; a perfect machine for all work, large or small. Send for our booklet, "Welding," and full description. Price, \$200 f. o. b. Kansas City. Admiral Mfg. Co., 715 Lydia Ave., Kansas City, Mo.

## PEERLESS BACK AND CUSHION DRESSING

For leather seats and cushions. Dries hard on clean leather. The color does not come off. Renews the finish. Ask your dealer.

The Columbus Varnish Co., Columbus, Ohio.

**PENNANTS FOR AUTOMOBILES MADE**  
in rights and lefts from any colored felts desired; size 12x30. Price \$1.00 per pair. Cash with order. Liberal discount to dealers. J. C. Orcutt Co., Inc., Lincoln, Neb.

**PUNCTURFIX SEALS PUNCTURES AU-**  
tomatically—fixes punctures while riding, without loss of air; increases mileage of tires and pleasure of riding 100%. Call and witness demonstration or write. Money making territory now open to hustlers. Chicago Motor Co., 1157 S. Wabash Ave., Chicago.

## PEERLESS EXTRA FINE BLACK JAPAN.

For all metal, lamps, radiators, fenders, etc. Air dries in 10 to 12 hours with a high gloss finish. Elastic, tough, durable; no primer; one coat covers solid. Ask your dealer.

The Columbus Varnish Co., Columbus, Ohio.

**PRESTO SELF STARTERS—WE HAVE A**  
few upon which snap price will be given.  
Algona Auto & Mch. Co.,  
Algona, Ia.

## PRICES THAT TALK.

Flanders "20" tops .....	\$13.50
Carburetors 1 1/4" (Mayer or Holley)...	3.50
Barnes Steering Gears .....	10.00
Splitdorf magnetos and coil .....	20.00
Trunks (size 31x17x12) .....	4.00
Side lamps (black and brass) per pair	3.50
E. M. F. springs (rear) .....	2.50
Universal joints 1/2" .....	5.00
16" ball bearing fans .....	2.25
12" ball bearing fans .....	1.50
Hyatt roller bearings (all sizes) .....	1.50
Head-light brackets 7" span....a pair	.50

Write for our new bargain sheets.

Autoparts Mfg. Co.,  
Detroit, Mich.

## PEERLESS EXTRA FINE BLACK BAKING JAPAN.

For baking on all metals, no primer, one coat covering solid. Bakes to a high gloss finish in 2 to 3 hours. Can also bake to a semi-gloss and dull finish. Ask your dealer. The Columbus Varnish Co., Columbus, Ohio.

**SCHLEBLER MODEL "L" CARBURETORS,**  
new, 1 1/4 or 1 1/2-inch, \$8.00 each. Order early. Kent Motor Car Co., Kenosha, Wis.

## RE-MAT YOUR CAR.

SAVE 80%.

I have on hand a large consignment of assorted sizes High-Grade, White-Face, Pyramid Rubber Mats for floor boards and running boards, suitable for any car; fifteen thousand; while they last:

20 x29 .....	\$0.40
29 1/2 x31 .....	.50
28 1/2 x34 .....	.50
7 1/2 x32 1/2 .....	.20
7 1/2 x30 .....	.20
8 1/2 x29 .....	.20
8 1/2 x33 .....	.20
7 x33 .....	.20
23 1/2 x33 1/2 (Buick) .....	.50
27 1/2 x32 (Buick) .....	.60
7 1/2 x44 (Buick) .....	.25

Terms: Express, C. O. D.; Parcel Post, cash with order, including postage.

A. W. Voege,

811 Woodward Ave., Detroit Mich.

**REPAINT YOUR CAR YOURSELF—WITH**  
our materials and full instructions, you can repaint your car as well as a regular painter and save from \$25 to \$50, depending on its size. Previous experience unnecessary. Latest colors. Write today for full information and color cards. We also make Liquid Gun Metal, the National Brass Enamel, \$1 a can express prepaid. The only articles of proven merit for lamps, radiators, etc. No polishing. Arsenal Varnish Co., Automobile Dept., Rock Island, Ill.

**SEAT COVERS FOR ALL CARS—SPECIAL**  
price on Fords. We clean old covers; make them look like new. Auto Cape Top Co., 2334 Michigan Ave., Chicago.

**SOME NEW AND USED REPAIR PARTS**  
for Model 10 Buick, 38 Overland and R. and T. Mitchell at one-half price. Ben Cloyd, McKinney, Texas.

## STEVENS AUTO TIRE VALVE

Adopted by Ralph De Palma, winner of the Vanderbilt Cup at Milwaukee, 1912. Can be attached instantly without any expense to any inner tube stem on any car. Saves one-half the time and labor necessary to inflate tires by any other method. Easily adjusted. Warranted not to leak. 200,000 in use. Send \$1.00 for set of four. Try them 30 days and if not satisfactory money will be cheerfully refunded. Stevens Manufacturing & Supply Co., 504 Fisher Bldg., Chicago.

**STOP, MECHANICS! WAKE UP! SEND**  
50 cents for hand-soap receipt and make it yourself; practice cleanliness; don't pay for fancy cans. A. G. Jung, 450 W. Main St., Madison, Wis.

**TAKE THE RATTLE OUT OF YOUR CAR.**  
Make it quiet. Anti-Rattle used, as directed on all worn parts and loose connections, will do it. Send \$1.00 for package with full directions to Anti-Rattle Co., Wallingford, Conn.

**TOPS BUILT, RECOVERED AND RE-**  
paired.

C. G. Meyer & Son, Tiffin, Ohio.

**TOURING, ROADSTER, RACING BODIES.**  
Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

Auto Sheet Metal Works,  
2228 Michigan Ave., Chicago.

**TWO MODEL B AIR FRICTION CAR-**  
buretors. Size 1 inch and 1 1/4. These carburetors are new and the latest improved. \$4.00 each. J. L. Wilson, Mangum, Okla.

**YOU CAN TURN OLD BRASS ON YOUR**  
automobile into beautiful, lasting, shining silver plate, easily and quickly, with Orient "Mystic" Silver Plater; to introduce to every automobile owner quickly we will send, prepaid, "concentrate" to make quart of this wonderful plater for \$1, which in bulk costs \$4; satisfaction guaranteed or money back. Orient Chemical Co., 467 Gumbel Bldg., Kansas City, Mo.

\$325.00 36 H. P. MOTORS, \$150.00.

4-cylinder, twin construction, aluminum crank case, 3 bearing crank shaft, 1 piece cam shaft. Completely equipped. Guaranteed 1 year. Full details on application. Oakbrook Motor Mfg. Co., Reading, Pa.

## UNHEARD OF BARGAINS.

UNEQUALLED PRICES.

## SELF STARTERS.

Disco self-starters for 4 and 6 cyl.; regular price \$50; our price, 4 cylinder \$7.50, 6 cylinder.....\$10.00

Automobile tops; regular silk mohair tops, side curtains and boots; 5 and 7 passenger; sold everywhere at \$75; our price ..... 30.00  
Price includes fitting.

## BODIES.

Our E body; handsome straight line, flush side, five passenger body, trimmed in highest grade of leather, and upholstered and painted and varnished; ready to set on your car; 34" wide and 94" long. Regular price \$350.00. Our price \$100.00.

Our 7 passenger body of equal quality and latest design; painted in the lead; 35" wide and 106" long. Regular price \$500.00. Our price .....\$125.00

A few handsomely trimmed and painted Colonial Coupe bodies. Regular Price \$800.00. Our Price .....\$300.00

## NEW ENGINES.

2 cylinder vertical, 14 h. p. ....	\$ 75.00
4 cylinder Mora, 20 h. p. ....	125.00
4 cylinder Maxwell, 20 h. p. ....	175.00
4 cylinder Chester, 25 h. p. ....	175.00
4 cylinder Buda, 35 h. p. ....	200.00
4 cylinder Herschell-Spellman, 50 h. p. ....	250.00
4 cylinder Poss, 25 h. p. ....	135.00
4 cylinder Welsh, 60 h. p. racing motor ....	300.00
6 cylinder Herschell-Spellman, 45 h. p. ....	350.00
2 cylinder opposed unit power plant..	85.00
3 cylinder Reliance, 45 h. p. ....	100.00
4 cylinder Reliance, 60 h. p. ....	125.00

We have some slightly used 4 cylinder, 35 h. p. Herschell-Spellman motors that we are offering for \$125.00 each.

## RADIATORS.

Ford, model T, \$16.00; Chalmers-Detroit, \$20.00; Buick, model 10, \$22.00; Stoddard-Dayton, \$25.00; Buick, model F, \$25.00. Abbott Detroit "44"—Abbott Detroit "30"—Case—Studebaker—Paige—Mitchell—Cutting—Autocar—Garford—Courier—Pullman—and others. Your choice at \$25.00 each.

## CARBURETORS.

Many different makes; prices range from \$2.50 each to \$12.50 each.

Rear Axles—Weston Mott geared 4 to 1; complete with wheels. Regular price \$120.00. Our price \$35.00.

Steering Column—Complete; \$15.00 each. Steering Gears—Alone; \$4.00 each.

Large auto trunks \$6.50 each. Trunk racks \$1.50 each.

## TOPS.

All makes of tops. Roadster tops \$15 each. Touring car tops from \$18 to \$35 each. \$18 to \$35 each.

## WIND SHIELDS.

One piece roadster shields. Regular price \$25.00. Our price \$12.50 each. All brass folding wind shields \$8.00 to \$15.00 each.

## MAGNETOS.

Splitdorf 2 cylinder; complete; \$15.00 each. Splitdorf 4 cylinder; complete; 25.00 each. Splitdorf 6 cylinder; complete; 30.00 each. Simms-Bosch high tension; complete; \$25.00 each. Remy 4 cylinder; complete; \$25.00 each. Jacobson-Brandon 1 cylinder \$6.50 each.

## TIRES.

Write for catalog and circulars with prices.

## SPEEDOMETERS.

"Standard" high grade instruments, regularly sold for \$25.00. Our price \$6.50. We have them only for 34 and 36 inch wheels.

## LAMPS.

We carry a full line of side oil lamps and gas headlights. They consist of jobs that we pick up at the different automobile factories and include some of the best makes. Side lamps—Prices from \$2.75 to \$5.00 a pair.

Head Lights—Prices from \$5.00 to \$15.00 a pair.

Tail Lights—Prices from \$2.00 to \$3.50 each.

## PRESTO TANKS.

We have just secured a job lot of model "B" tanks filled and complete with brackets. Regular price \$25.00. Our price \$13.50 each.

TIMES SQUARE AUTOMOBILE CO.,

1210-1212 MICHIGAN AVE.,  
CHICAGO.

1743 Broadway, near 56th St.,  
New York City.

### TO DOUBLE LIFE OF AUTO TOPS USE GLAZENE.

Prevents sun rot and leaks  
On tops and on seats.  
Costs \$1.00, delivered. Satisfaction guaran-  
teed or money back.

The Glazene Co.,  
1328 Jackson Blvd., Chicago.

### Ball Bearings

#### BALL BEARINGS REGROUND. RIGHT NOW.

Give us a chance to demonstrate that bear-  
ings reground by the Ahlberg process are as  
serviceable as new ones. Three years of  
Test and Success stand back of us and our  
bona fide guarantee accompanies all work.

We carry in stock at all times complete  
line of Annular, Thrust, Radax and Double-  
Row Bearings. Facilities enable us to make  
special size bearings to your specifications.

Write Now.

Ahlberg Bearing Co.,  
2640 Michigan Ave., Chicago.  
New York. Branches Detroit.

#### BALL & ROLLER BEARINGS, ALL TYPES.

Distributors of  
"F & S" Ball Bearings.  
"New Departure" Ball Bearings.  
"Pressed Steel" Ball Bearings.  
"Standard" Ball and Roller Bearings.  
BALL BEARINGS REPAIRED.  
THE GWILLIAM COMPANY,  
New York—Broadway, at 58th St.  
Philadelphia—1314 Arch St.

### Cars Wanted

I NEED AN AUTOMOBILE; HAVE  
equity of \$2,000 in 100 acre farm a hundred  
miles from Kansas City; will trade this for  
a good car, balance cash. Address J. Pohl,  
612 East 9th St., Kansas City, Mo.

MY KINGDOM FOR A CAR  
160 Acres fine Oklahoma land; level; soil  
black loam; all fenced; house; at \$20.00 per  
acre, worth more, but I want a car; what  
have you in exchange?  
A. L. Stone, Texline, Tex.

WANTED—LATE MODEL T FORD TOUR-  
ing Car for cash. Give lowest cash price  
in first letter. Blank & Six, Ashland, Ill.

WANTED—SECOND-HAND AUTO IN EX-  
change for stock of talking machines, etc.  
Address  
H. S. Sanborn, Middleport, O.

WANTED—SECOND-HAND SMALL CAR.  
State description and lowest price in first  
letter.  
Leo Baldauf, Oskaloosa, Ia.

WANTED—1912 AUTO IN EXCHANGE  
for 160 acres good Minnesota land. Ad-  
dress Box 414, Marshalltown, Iowa. k

### Parts and Accessories WANTED

WANTED—RAMBLER SPARE WHEEL  
for model 64; tools not wanted. H. J.  
Jewitt, Fairdale, Ill.

### Auto Wearing Apparel

ATTENTION AUTO OWNERS  
A genuine English slip-on Auto Rain Coat.  
Guaranteed waterproof at \$6.00. You are  
buying direct from manufacturer. Send  
money order. Express prepaid. National  
Rubber Rain Coat Co., 310 E. State St., Rock-  
ford, Ill. b

### Situations Wanted

CHAUFFEUR WISHES POSITION WITH  
private party about May 1, 1913. Young  
man; have had 4 years' experience driving  
and repairing; at present in auto factory;  
strictly sober. Box D 338, c/o Motor Age. f

A LIVE, HUSTLING, UP-TO-DATE AMER-  
ican seeks position with going automobile  
concern as service manager, in repair parts  
department at factory or at service station.  
Ten years with four America's leading build-  
ers, as chief inspector, experiment superin-  
tendent, service manager. Have salesman-  
ship ability, handle men. Executive ability  
and greatest efficiency in maintenance and  
operation. At present manager of business  
in which my interest is being disposed of.  
Address Box D 310, c/o Motor Age. m

AMERICAN HIGH SCHOOL TEACHER,  
spending year in Europe, desires position  
as chauffeur to tour Europe during summer  
of 1913. Speaks German and French. Ex-  
pert driver. American and European refer-  
ences. For particulars address Box D 312,  
Motor Age, or directly to Manly C. Wareham,  
10 Rue Victor Hugo, Croix, Nord, France.

CHAUFFEUR DESIRES PERMANENT  
position with party requiring thoroughly  
reliable driver and repairman. No objection  
to traveling or final location, as I have had  
traveling experience in nearly every part of  
the world. Salary not less than \$150.00 per  
month. For particulars address Box D 323,  
c/o Motor Age. w



### Out of a Job?

MOTOR AGE classified  
columns find the job for the  
man and the man for the  
job.

This proposition holds  
good from sales managers  
to factory mechanics.

CHIEF ENGINEER WANTS CHANGE  
position; with 20 years' practical experi-  
ence; thoroughly posted in Auto design, ex-  
perimenting and manufacture; is good ex-  
ecutive with original idea; have passed the  
experimenting stage and can assure you suc-  
cess. Write Box D 343, c/o Motor Age. z

POSITION AS DESIGNER AND DRAFTS-  
man; ten years' experience in automobile  
business; thoroughly familiar with shop work  
and all kinds of drawings. Address Box D  
290, c/o Motor Age. v

ENGINEER—HAVE HAD 8 YEARS' EX-  
perience in the design of pleasure and com-  
mercial cars; am open for engagement. Box  
D 341, c/o Motor Age. s

FIVE YEARS' EXPERIENCE, THREE AS  
secretary concern selling over hundred  
cars annually. Have done the bookkeeping,  
systematizing, contracting, buying, advertis-  
ing and selling cars; know the game from A  
to Z. Also other executive experience. Can  
take charge of any department or entire  
business and make it a go. Young man, en-  
ergetic, healthy, sober, with personality, vim  
and experience. Postoffice Box 466, San An-  
tonio, Texas. g

SITUATION WANTED—AS CHAUFFEUR  
by man who is capable of acting as secre-  
tary or instructor to children. References.  
T. Andersen, 11640 Yale Ave., Chicago, Ill.

TRUCK ENGINEER, WITH CONSIDER-  
able experience, would consider a change.  
Address Box D 328, c/o Motor Age. d

SALESMAN OF EIGHT YEARS OF EXPE-  
rience and of wide acquaintance desires to  
make connection with a live firm where ex-  
perience and hard work will be appreciated.  
Until recently was employed by firm man-  
ufacturing medium-priced car as assistant  
sales manager. Had best of reason for leav-  
ing their employ.

Can furnish best of references as to my  
ability and reliability. Address Box D 337,  
c/o Motor Age. r

### SALES EXECUTIVE.

Opportunity wanted to make permanent  
connections with responsible manufacturing  
concern. Twelve years' selling experience;  
am also a mechanical engineer and conver-  
sant with production costs; willing to start  
from below if there is opportunity to work  
toward a permanent executive position. Ad-  
dress Box D 296, c/o Motor Age. k

### SALES MANAGER.

Experienced business man with very wide  
trade acquaintance wishes to market output  
of truck factory on salary and commission  
basis. Box D, 238, c/o Motor Age. f

WANTED—POSITION AS CHAUFFEUR  
for automobile party going West or North  
for summer outing of one or two months.  
All references as to driving and mechanical  
ability. Address Box D 314, Motor Age. r

WANTED—POSITION AS FIELD AUTO  
salesman in Michigan. Have thorough  
knowledge of both retail and wholesale meth-  
ods; am considered to be a first-class, re-  
sourceful business producer; will guarantee to  
make good. Desire connection with first-class  
house where the services of a high-class  
man will be appreciated.

Address Box D 289, c/o Motor Age. m

### Help Wanted

#### AAA OPEN POSITIONS.

17 Draftsmen, Detailers and Designers,  
\$900-\$2,500; Technical Adv. Man, \$1,200-  
\$1,800, machinery; Tool Designer, \$1,200-  
\$1,500; Detailer and Stock Biller, \$1,200;  
Blacksmith Foreman, \$1,500-\$1,800; Metal  
Patternmakers, best wages; Sr. Accountant,  
\$2,000; Trav. Auditor, \$1,500; 14 Bkprs.,  
\$780-\$1,500; Cost Acct., \$1,040-\$1,500;  
Corresp., \$1,040-\$1,200, engraving; District  
Mgr., \$5,000-\$6,000, packing house; 23  
Stenogs., \$780-\$1,040.

Every position open, besides many more  
not listed. Write us immediately. Always  
glad to explain.

BUSINESS MEN'S CLEARING HOUSE,  
323, 108 La Salle St., Chicago.

HELP WANTED—WELL EXPERIENCED  
electrician and automobile mechanic, steady  
employment, good wages; married man pre-  
ferred. J. O. Yahn, Ohio City, Ohio.

MECHANICAL ENGINEERS, SUPERIN-  
tendents, works managers and designers  
wanted. The Engineering Agency, Inc.,  
Monadnock Bldg., Chicago.

WANTED—AN AUTOMOBILE ACCESSORY  
salesman with a proven record of results  
in introducing new auto accessories, as sales  
manager for an entirely new article of great  
merit and value to motorists. Device a  
proven necessity and only needs a producer  
behind it. A man who would, after being  
"Shown," invest in company preferred. Give  
concise history of past connections, volume  
of sales made, qualifications, references,  
etc., in first letter. Address Specialty Ma-  
chine Co., 95 Liberty St., New York City.

WANTED—MALE HELP—THOROUGHLY  
competent man to act as final inspector  
and production man in old established auto  
body factory producing closed and open  
bodies painted and trimmed. An excellent  
opportunity for live man. Address Box D  
342, c/o Motor Age. r

WANTED 50 HIGH GRADE MEN  
Managers, Engineers, Superintendents, and  
Draftsmen with Automobile Experience.  
The Toledo Engineering Agency,  
1228 Ohio Bldg., Toledo, Ohio.

### Salesmen Wanted

SALESMAN—ONE WHO IS NOW VISITING  
automobile trade or owners. Good money  
made on a very attractive proposition.  
Sturdy Mfg. Co., 2637 Michigan Av., Chicago.

SALESMAN—ONE WHO IS NOW VISIT-  
ing the automobile and truck manufac-  
turers, or the jobbers of automobile acces-  
sories, or jobbers of hardware. We have  
a very attractive proposition. Correspond-  
ence solicited and confidential. Sioux City  
Machine & Tool Co., Sioux City, Iowa.

WANTED—A FIRST CLASS SALESMAN  
to take charge of the sales of gear plant.  
Product of proven merit. Opportunity also  
for investment. Good chance for the right  
party if competent. Address Box D 306, c/o  
Motor Age. •



**SALESMAN WANTED — EXPERIENCED**  
man to travel western states to sell line of Automobile and Carriage Hardware. One familiar with Automobile Trade preferred. Address, stating age, experience and salary expected.

John F. Galvin,  
165 Broadway, New York City, N. Y. m

**SALESMEN WANTED**  
to represent us in territory not now contracted to sell our Auto Combination Ignition Locks; inexpensive, convenient, simple, readily applied to any car. Excellent proposition for your entire time, but can be handled as side-line by salesmen calling on automobile trade and owners. Exclusive territory; terms, etc.

Auto Combination Mfg. Co.,  
1467 Michigan Ave., Chicago.

**SALES AGENTS—ONE WHO IS NOW**  
visiting the Automobile and Truck manufacturers, or the Jobbers of Automobile Accessories or Jobbers of Hardware. We have a very attractive proposition. Correspondence solicited and confidential. Sioux City Machine & Tool Co., Sioux City, Iowa.

## Business Opportunities

### A NOTICE TO THE TRADE

#### BOYER'S AUTOMOBILE REFINISHER

Has taken the motor car industry by storm. Live dealers, write or wire for particulars.

Boyer Chemical Co.,  
2 E. Michigan St., Chicago.

**FIRST-CLASS AUTOMOBILE MAN WANTS**  
partner with some money to open garage and shop in good automobile town; have had twelve years' experience; can deliver the goods. Address Postoffice box 319, Fort Worth, Texas. b

**FOR SALE—FULLY EQUIPPED AUTO REPAIR**  
shop in city of 45,000. Good reason for selling. Legal News, Topeka, Kansas.

**FOR SALE—GARAGE, CENTRAL OHIO.**  
Finest of any in the state in a city of 25,000. Address Box D 333, c/o Motor Age. s

**FOR SALE—HAYWOOD VULCANIZER,**  
Model H. Used three months. Perfect condition. Price low. Box D 335, c/o Motor Age. p

**FOR SALE—MOST THOROUGH EQUIPPED**  
garage and general repair shop in Iowa at a bargain. Address Box D 336, c/o Motor Age. f

#### FOR SALE—ON ACCOUNT OF OTHER

business interests we offer our entire manufacturing plant, building a full line of commercial vehicles and auto trucks, at par value, in a city of 35,000, in the state of Iowa. The business is well established and enjoying a good trade; this is a gilt edge proposition; will invoice about \$50,000. Address Box D 332, c/o Motor Age. b

**FOR SALE—TIRE FILLING PLANT: COMPLETE,**  
with formula and instruction for filling; absolutely non-puncturable; a real money maker; investigate. Box 7, Phoenixville, Pa.

#### PLANT FOR SALE CHEAP.

Suitable for auto bodies (especially Limousine) and accessories. Power, lights, water, dry kilns, sprinklers, side tracks, abundant storage. The A. J. Phillips Co., Fenton, Mich.

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# DOVER

## Garage Specialties

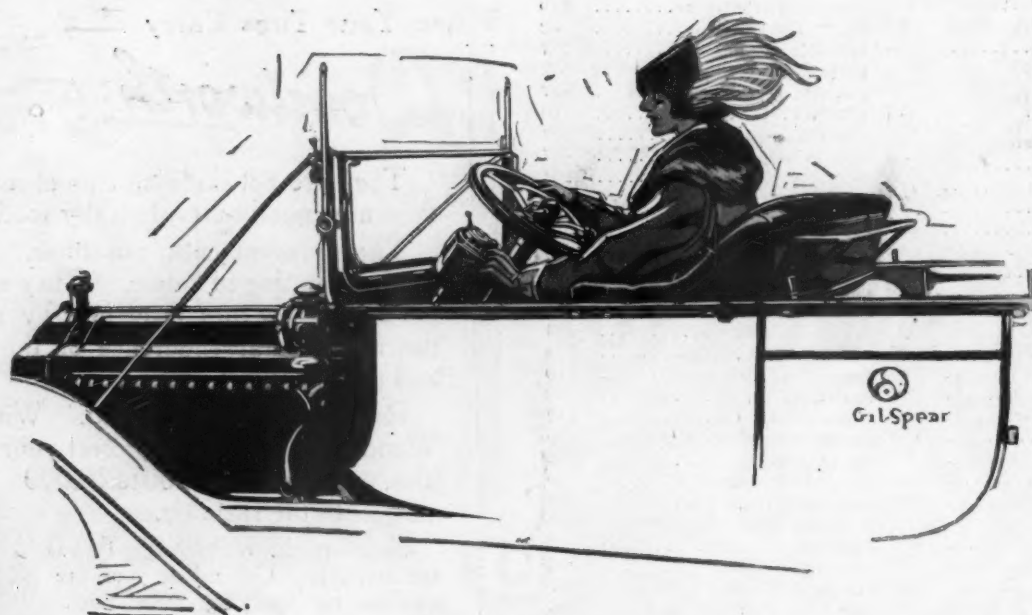
DOVER STAMPING and MFG. CO.  
CAMBRIDGE-MASS.

Dealers, write for our complete catalogue of garage accessories

DOVER STAMPING & MFG. CO.  
CAMBRIDGE, MASS.

When Writing to Advertisers, Please Mention Motor Age.





## THE GENTLEWOMAN'S MOTOR CARRIAGE

The New Packard "38" answers the demand for easy, safe and restful travel over any road. It combines the acknowledged advantages of left drive with electric starting, electric lighting and centralized control.

Centralized control is an improvement enjoyed exclusively by owners of Packard carriages. The control board is on the steering column and the controls are operated without leaning forward or moving in any way from the driving position. This perfect mastery of the car gives a new sense of security and means entire freedom from fatigue and the nerve tension experienced when operating an ordinary car.

A row of buttons gives instant control of the electric lights. Another button actuates the magnetic inter-lock of the electric starter. The Bosch coil switch controls the ignition and a simple hand wheel adjusts the carburetor to meet all requirements.

Every detail of operation is at the driver's finger tips. There is no stooping or fumbling for switches on the dash.

You enter the front compartment from the curb and start the motor without stepping into the road. You have the added advantage of the full view ahead and greater assurance in driving through traffic.

Owing to the unparalleled demand for Packard Sixes this spring, it is necessary to act promptly in order to secure a desirable date of delivery.

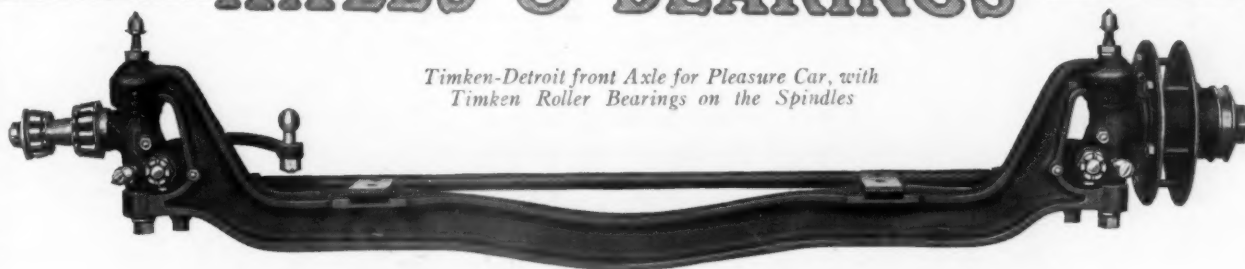
*Ask the man who owns one*

COLOR CATALOG ON REQUEST

**Packard Motor Car Company, Detroit**

# TIMKEN

## AXLES & BEARINGS



*Timken-Detroit front Axle for Pleasure Car, with  
Timken Roller Bearings on the Spindles*

### Unseen Wonders of Motor-Car Axles

**T**HEY are not complicated, yet each Timken-Detroit Axle is a mechanical marvel.

In the two axles shown on this page there are 848 pieces, counting each Timken Roller Bearing as one. Of these 848 pieces, 723 are in the rear axle.

That is because the rear axle must drive the car, allow the rear wheels to turn at different speeds in rounding corners, and through its brakes take the stresses of stopping.

It, with the front axle, must carry the whole load and take all the shocks and vibrations of hard travel.

Every part in these axles has a duty to perform. Every part must be correctly designed for that duty.

It is one thing to make these hundreds of pieces of metal right. It is another—and just as essential—to prove them right after they are made.

Both are equally important to your satisfaction—and to your safety.

You must be able to put your reliance on the steel—on the skill with which it is fashioned into the axle-parts—on the proper heat-treating of these parts—on the unerring, unchanging accuracy with which they are assembled—on the unfailing thoroughness with which they are tested.

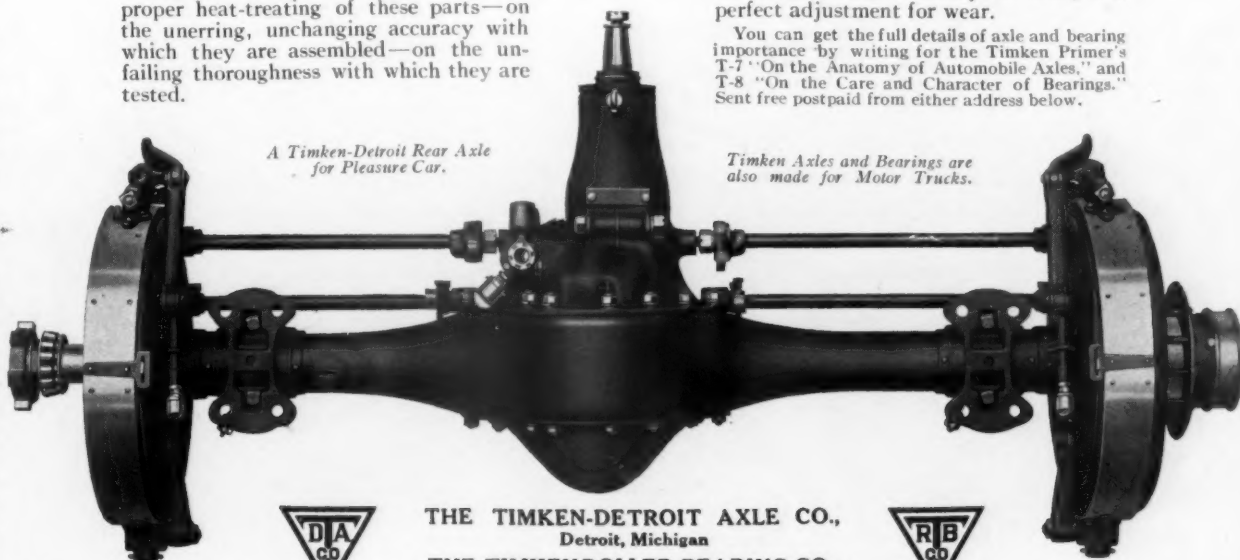
It's impossible for you to prove that each part and piece is rightly made.

But you can prove that it has been made by men whom you can trust—if it's a Timken-Detroit Axle.

"Timken" stands for an organization devoted wholly to one ideal—the building of good motor-car axles.

And "Timken" stands also for another organization, whose product is the Timken Tapered Roller Bearing—the one type of motor-car bearing that combines greatest capacity for vertical load, and for end-thrust; least tendency to wear, and perfect adjustment for wear.

You can get the full details of axle and bearing importance by writing for the Timken Primer's T-7 "On the Anatomy of Automobile Axles," and T-8 "On the Care and Character of Bearings." Sent free postpaid from either address below.



*A Timken-Detroit Rear Axle  
for Pleasure Car.*

*Timken Axles and Bearings are  
also made for Motor Trucks.*



THE TIMKEN-DETROIT AXLE CO.,  
Detroit, Michigan  
THE TIMKEN ROLLER BEARING CO.,  
Canton, Ohio





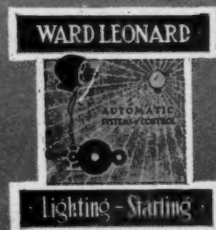
# Renault Cars use the Ward Leonard System

The first lighting and starting system to overcome European prejudice

The most critical automobile engineers in the world, men who have heretofore insisted that crankless cars were impossible, now admit the correctness of the **WARD LEONARD Lighting and Starting System** and its faultless operation.

European car manufacturers like to believe that all real automobile improvements and innovations emanate from Europe, and they have refused starting devices until one was put on the market which would coincide thoroughly with their technical ideas of design and operation. *Every Renault sold in America is equipped with the WARD LEONARD System.*

**WARD LEONARD ELECTRIC CO.**  
BRONXVILLE, NEW YORK



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## AUTOMOBILES RENAULT

RENAULT SELLING BRANCH INC.

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NEW YORK BRANCH  
214 & 216 WEST 65TH STREET

MAIN OFFICE

214 & 216 WEST 65TH STREET

NEW YORK March 17, 1913.

The Ward-Leonard Electric Co.

Bronxville, N. Y.

Gentlemen: Enclosed you will find a very complimentary letter addressed to us, praising your lighting and starting system which you installed on one of our big six cylinder Chassis. It gives us great pleasure in forwarding a letter of this kind to you, as your system cannot be too highly praised in our estimation.

All the Chassis of our make, of both large and small H. P. which have been equipped with the Ward-Leonard System are giving perfect satisfaction in every way, and are really 100% perfect. Our customers as a rule are most critical, and have expert mechanics to drive and take care of their cars, and if the Ward-Leonard System had not proven perfect, we would have heard of it long before this.

Thanking you for the many courtesies you have extended to us, and your always prompt attention to our wants and communications, we beg to remain, with best wishes and kindest regards,

Yours respectfully,

Renault Selling Branch.

*Norman Mason*  
Sales Mgr.

B/M



*Steinhardt & Kelly*  
Subsistence Supplies and Export Merchants  
New York, Mar. 18th, 1913.

Mr. Morris E. Mason,  
Renault Selling Branch Inc.,  
719 Fifth Av., N. Y.

My dear Mr. Mason:  
Replying to your letter of the 6th inst., beg to say that the Ward-Leonard lighting and starting system which you had installed on my six cylinder Renault Car, is giving excellent service, and never fails to start the car.  
My chauffeur informed me this morning that the lighting and starting system is the best that he has ever seen.  
I have therefore decided to send my 14/20 Renault town car, to you within the next few days, to have the Ward-Leonard lighting and starting system installed the same as you did on the big six.  
Many thanks for your attending to this, with kindest regards,

Very truly yours,  
*John Steinhardt*